Appendix A – June 27, 2005, Notice of Intent by Tennessee Valley Authority to Prepare an Environmental Impact Statement for Rutherford-Williamson-Davidson Power Supply Improvement Project

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Total Estimated Annual Burden: 16,416 hours.

Dated: June 24, 2005.

Craig Hartson,

Acting Reports Clearance Officer, Social Security Administration.

[FR Doc. 05–12980 Filed 6–30–05; 8:45 am]

BILLING CODE 4191–02–P

TENNESSEE VALLEY AUTHORITY

Environmental Impact Statement for Rutherford-Williamson-Davidson Power Supply Improvement Project

AGENCY: Tennessee Valley Authority.

ACTION: Notice of intent.

SUMMARY: The Tennessee Valley Authority (TVA) will prepare an environmental impact statement (EIS) addressing the proposed construction and operation of a new or expanded 500-kilovolt (kV) substation and associated transmission line upgrades in middle Tennessee. The substation would be located in Rutherford, Williamson, or Davidson County. Other project components would be located in these counties and in other counties in middle Tennessee. In the EIS, TVA will evaluate the potential environmental impacts of the construction, operation, and maintenance of the new and upgraded facilities. TVA will use the EIS process to obtain public involvement on this proposal. Public comment is invited concerning both the scope of the EIS and environmental issues that should be addressed as a part of this EIS.

DATES: Comments on the scope and environmental issues for the EIS must be postmarked or e-mailed no later than August 8, 2005, to ensure consideration.

ADDRESSES: Written comments should be sent to Charles P. Nicholson, Environmental Policy and Planning, Tennessee Valley Authority, Mail Stop WT 9B, 400 West Summit Hill Drive, Knoxville, Tennessee 37902–1401. Comments may be e-mailed to *cpnichol@tva.gov.*

FOR FURTHER INFORMATION CONTACT: Hugh S. Barger, Environmental Engineer, Transmission/Power Supply, Tennessee Valley Authority, Mail Stop MR 4G–C, 1101 Market Street, Chattanooga, Tennessee 37402–2801. Telephone (423) 751–3131. E-mail may be sent to *hsbarger@tva.gov.*

SUPPLEMENTARY INFORMATION:

Background

The population in Murfreesboro, Franklin, and surrounding areas of Middle Tennessee has grown at a rate of 4.3 percent per year since 1990. TVA supplies bulk electricity to this area through its Davidson, Pinhook, and Wilson 500-kV Substations. As a result of the rapid population growth, the electrical load for this area has also grown rapidly and is expected to exceed the capacity of the 500-kV substations serving the area by 2010. Several 161-kV transmission lines serving the area from these substations are also expected to become overloaded by 2010.

TVA has studied these problems and tentatively concluded that the best method of remedying them is to either construct a new 500-kV substation or expand an existing 500-kV substation. The solution would also require the construction and operation of new 500-kV and 161-kV transmission lines and/or upgrades to existing transmission lines.

Project Description

TVA has three potential alternative solutions. The first would involve the construction of a new 500-kV substation in southwest Rutherford County near Eagleville. The substation would require an area of at least 50 to 75 acres. Major substation components would include four 500/161-kV transformers, two 500-kV breakers, and nine 161-kV breakers. TVA would also add four 500-kV breakers to its Maury 500-kV substation in north-central Maury County.

As part of this solution, TVA would also construct and operate a new 500-kV transmission line from its Maury 500-kV Substation to the new 500-kV substation. This line would likely be about 2725 to 30 miles long and would be built on right-of-way purchased by TVA in the 1970s for construction of the Hartsville-Maury 500-kV transmission line. This line was never completed and the portion of the right-of-way proposed for the new 500-kV line has remained in TVA ownership and was never cleared. Three 161-kV transmission lines are also proposed. One of these, from the new 500-kV substation to the Almaville Substation, would be about 7 miles long and built on vacant right-of-way owned by TVA. A double-circuit line about 12 miles long would be built on new right-of-way between the new substation and the Christiana substation. Another line about 2.5 miles long would connect the Murfreesboro-Triune-E. Franklin 161-kV transmission line to the new substation. The proposed transmission lines are located in Rutherford, Maury, and Williamson Counties.

The second potential solution involves the construction and operation of a new 500-kV substation in northeast Williamson County near Brentwood. The substation would be similar to that described for the first solution. As part of the second solution, TVA would also upgrade about 75 miles of existing 161-kV transmission lines. These transmission lines are located in Davidson, Rutherford, Williamson, Sumner, Wilson, Coffee, Franklin, and Bedford Counties. The upgrade work could range from replacing the conductors to completely rebuilding the lines.

The third potential solution involves the expansion of TVA's existing Pinhook 500-kV Substation in southwest Davidson County. The substation would be expanded by adding a second bank of 500/161-kV transformers. This solution would also require the upgrading of about 115 miles of existing 161-kV transmission lines. These transmission lines are located in Davidson, Rutherford, Maury, Williamson, Coffee, Franklin, and Bedford Counties.

The new 500-kV transmission line would likely be built using self-supporting, laced steel towers on right-of-way 175 feet in width. The new 161-kV lines would likely be built using self-supporting single-pole or H-frame steel towers on right-of-way 100 feet wide. The structure types, right-of-way characteristics, and line lengths remain to be determined and could change when additional information is gathered.

Line construction would require removal of trees within the line right-of-way as well as any other nearby tall trees which would endanger the safe operation of the line. Construction of the 500-kV support structures would require the excavation of foundations for each of the tower legs. Support structures for the 161-kV lines would normally not require separate foundations and the poles would be embedded in drilled holes. Cranes and other heavy equipment would be needed to construct the towers and pull the electrical conductor into place. After construction, the disturbed areas would be restored, and the right-of-way would be maintained periodically to control the growth of tall vegetation that could endanger the line. A detailed description these activities, as well as applicable and appropriate environmental protection measures, will be provided in the EIS.

After the completion of scoping, TVA will begin detailed studies for siting the substation and routing the transmission lines using maps, aerial photography and other relevant data. When the studies have progressed sufficiently, potentially affected landowners will be contacted directly, and additional field surveys will be conducted.

Proposed Issues To Be Addressed

The EIS will contain descriptions of the existing environmental and socioeconomic resources within the area that would be affected by construction and operation of the proposed transmission line and upgrades. TVA's evaluation of potential environmental impacts to these resources will include, but not necessarily be limited to, the potential impacts on water quality, aquatic and terrestrial ecology, endangered and threatened species, wetlands, aesthetics and visual resources, land use, historic and archaeological resources, and socioeconomic resources. The need and purpose of the project will be discussed.

Alternatives

The results of evaluating the potential environmental impacts and other important issues identified in the scoping process, as well as engineering and economic considerations, will be used by TVA in selecting identifying a preferred alternative. At this time, the range of alternatives TVA has identified for detailed evaluation includes no action and the three alternative solutions described above. The ability of energy conversation to meet projected demands will be addressed. As analyses proceed, one or more alternatives may be eliminated due to technical infeasibility, unacceptable environmental impacts, or unreasonably high economic costs. TVA also expects to evaluate multiple sites for the new substation.

Scoping Process

Scoping, which is integral to the process for implementing the National Environmental Policy Act (NEPA), is a procedure that solicits public input to the EIS process to ensure that: (1) Issues are identified early and properly studied; (2) issues of little significance do not consume substantial time and effort; (3) the draft EIS is thorough and balanced; and (4) delays caused by an inadequate EIS are avoided. TVA's NEPA procedures require that the scoping process commence soon after a decision has been reached to prepare an EIS in order to provide an early and open process for determining the scope and for identifying the significant issues related to a proposed action. The range of alternatives and the issues to be addressed in the draft EIS will be determined, in part, from written comments submitted by mail or e-mail, and comments presented orally or in writing at any public meetings. The preliminary identification of reasonable alternatives and environmental issues in this notice is not meant to be exhaustive or final.

The scoping process will include both interagency and public scoping. The public is invited to submit written comments or e-mail comments on the scope of this EIS no later than the date given under the **DATES** section of this notice.

TVA will conduct a public scoping meeting on July 11, 2005. This informal meeting will begin at 4 p.m. and end at 8 p.m. (CST). The meeting will be held at the Eagleville High School, 500 Highway 99, Eagleville, Tennessee, Tennessee.

At the meeting, TVA management and project staff will present overviews of the proposed transmission line project and the EIS process, answer questions, and solicit comments on the issues that the public would like addressed in the EIS. These meetings will be publicized through notices in local newspapers, by TVA press releases, on the TVA Web site at *http://www.tva.gov/environment/calendar.htm* and in letters to local elected officials preceding the public meetings.

The agencies to be included in the interagency scoping are U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Tennessee Department of Environment and Conservation, the Tennessee State Historic Preservation Officer, and other Federal, State, and local agencies, as appropriate. After consideration of the scoping comments, TVA will further identify alternatives and environmental issues to be addressed in the EIS. Following analysis of the environmental consequences of each alternative, TVA will prepare a draft EIS for public review and comment. Notice of availability of the draft EIS will be published by the Environmental Protection Agency in the **Federal Register**. TVA will solicit written comments on the draft EIS, and information about possible public meetings to comment on the draft EIS will be announced. TVA expects to release a draft EIS in the fall of 2006 and a final EIS in early 2007.

Dated: June 27, 2005.

Kathryn J. Jackson,

Executive Vice President, River System Operations & Environment.

[FR Doc. 05–13013 Filed 6–30–05; 8:45 am]

BILLING CODE 8120–08–P

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Andean Trade Preference Act (ATPA), as Amended: Notice Regarding the 2003 and 2004 Annual Reviews

AGENCY: Office of the United States Trade Representative.

ACTION: Notice.

SUMMARY: In January 2005, the Office of the United States Trade Representative (USTR) published a notice specifying the results of the preliminary review of petitions it received in September 2004 in connection with the annual ATPA review and modifying the schedule for consideration of the remaining petitions. The January 2005 notice also specified the status of the petitions filed in 2003 that have remained under review. The Trade Policy Staff Committee has decided to continue the review of pending petitions.

FOR FURTHER INFORMATION CONTACT: Bennett M. Harman, Deputy Assistant U.S. Trade Representative for Latin America, at (202) 395–9446.

SUPPLEMENTARY INFORMATION: The ATPA (19 U.S.C. 3201 *et seq.*), as renewed and amended by the Andean Trade Promotion and Drug Eradication Act of 2002 (ATPDEA) in the Trade Act of 2002 (Pub. L. 107–210), provides trade benefits for eligible Andean countries. Pursuant to section 3103(d) of the ATPDEA, USTR promulgated regulations (15 CFR part 2016) (68 FR 43922) regarding the review of eligibility of countries for the benefits of the ATPA, as amended.

In a **Federal Register** notice dated August 17, 2004, USTR initiated the 2004 ATPA Annual Review and announced a deadline of September 15, 2004 for the filing of petitions (69 FR 51138). Several of these petitions requested the review of certain practices in certain beneficiary developing countries regarding compliance with the eligibility criteria set forth in sections 203 (c) and (d) and section 204(b)(6)(B) of the ATPA, as amended (19 U.S.C. 3203 (c) and (d); 19 U.S.C. 3203(b)(6)(B)).

In a **Federal Register** notice dated January 18, 2005 (70 FR 2921), USTR published the results of the preliminary review of these petitions. The TPSC terminated the review of one petition and modified the date for the announcement of results for both the remaining 2004 petitions and the remaining 2003 petitions to on or about May 31, 2005.

With respect to the outstanding petitions, the TPSC is modifying the schedule for the review, in accordance

Appendix B – Correspondence Relating to Rutherford-Williamson-Davidson Power Supply Improvement Project

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TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

August 23, 2007

Dr. Thomas Maher
Tennessee Valley Authority
400 W. Summit Hill Drive
WT 11D - Cultural Resources
Knoxville, Tennessee 37902

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, MAURY-RUTHERFORD/
SWITCHING STATION, UNINCORPORATED, MAURY COUNTY, TN

Dear Dr. Maher:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre
Executive Director and
State Historic Preservation Officer

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

August 16, 2007

Dr. Thomas O. Maher
Tennessee Valley Authority
400 West Summet Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, 161 KV LINE/ALMAVILLE SHRISTIANA, UNINCORPORATED, RUTHERFORD COUNTY

Dear Dr. Maher:

In response to your request, received on Friday, August 3, 2007, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may also find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at http://www.tennessee.gov/environment/hist/federal/sect106.shtml.

Based on available information, we concur that the project as currently proposed will NOT ADVERSELY AFFECT ANY NATIONAL REGISTER OF HISTORIC PLACES-LISTED PROPERTY SO LONG AS THE FOLLOWING CONDITION (S) ARE MET:

This project avoids archaeological site 40RD280 AND 40RD281

Unless project plans change, and so long as the condition is met, this office has no objection to the implementation of this project. Should project plans change, please contact this office to determine what additional action, if any, is necessary. Questions and comments may be directed to Joe Garrison (615) 532-1550-103. Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre

E. Patrick McIntyre
Executive Director and
State Historic Preservation Officer

EPM/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

June 29, 2007

Dr. Thomas O. Maher
Tennessee Valley Authority
400 West Summet Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, 500 KV TRANSMISSION LINE, RUTHERFORD, MAURY COUNTY

Dear Dr. Maher:

In response to your request, received on Monday, June 18, 2007, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may also find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at http://www.tennessee.gov/environment/hist/federal/sect106.shtml

Considering available information, we find, after applying the Criteria of Adverse Effect codified at 36 CFR Part 800, that the project as currently proposed will ADVERSELY AFFECT PROPERTIES THAT ARE ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES, namely the Smithson-McCall Farm and the William Allison House. You should now, through TVA, inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. Until you have received a final comment on this project from this office and the Council, you have not completed the Section 106 review process. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

Richard G. Tune
Deputy State Historic
Preservation Officer

RGT/jyg

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Natural Heritage
7th Floor L&C Annex
401 Church Street
Nashville, Tennessee 37243
Phone 615/532-0431 Fax 615/532-0046

May 8, 2006

Charles P. Nicholson
TVA Environmental Policy and Planning
400 West Summit Hill Dr., WT 9B
Knoxville, TN 37902-1401

Subject: Rutherford-Williamson-Davidson Power Supply Improvement Project

Dear Mr. Nicholson:

The Division of Natural Heritage (DNH) has reviewed the documents available on your website regarding the Rutherford-Williamson-Davidson Power Supply Improvement Project, including: Notice of Intent, Scoping Document, and Project Area Map. According to these documents, the Tennessee Valley Authority (TVA) proposes to construct a new 500-kV substation and associated transmission line upgrades in middle Tennessee. The substation would be located in Rutherford County, with new and/or upgraded transmission facilities also located in Rutherford, Williamson, and Maury Counties. We have reviewed the project summary information and submit the following comments for consideration.

A review of our rare species database indicates that the following listed species have been documented within the footprint or in very close proximity to the proposed substation locations indicated in Figure 3. of the Scoping Document:

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank
Vascular Plant					
Astragalus tennesseensis	Tennessee Milk-vetch		S	G3	S3
Talinum calcaricum	Limestone Fame-flower		S	G3	S3
Nonvascular Plant					
Cololejeunea ornata	Ornate Cololejeunea		T	G2G4	S1
Lejeunea sharpii	Sharp's Lejeunea		E	G1G2	S1S2
Vertebrate Animal					
Gyrinophilus palleucus	Tennessee Cave Salamander		T	G2G3	S2
Typhlichthys subterraneus	Southern Cavefish		D	G4	S3
Invertebrate Animal					
Pseudanophthalmus acherontis	Echo Cave Beetle			G1	S1S2

Pseudanophthalmus acherontis	Echo Cave Beetle	G1	S1S2

Many of these rare species are concentrated at Snail Shell Cave and Echo Cave including: the Echo cave beetle, Tennessee cave salamander, and southern cavefish. The Echo cave beetle is a G1 species and is considered critically impaired, with 3 occurrences in the world, two of which are at Echo Cave and Snail Shell Cave. Disturbance of either of these populations would make this species vulnerable to extinction. The Tennessee cave salamander, listed as State Threatened, is also considered very rare and imperiled throughout it's range. We have also attached a separate list of rare species that have been documented within a 4-mile radius of the project area.Consideration for these species should likewise be given, if suitable habitat exists in the project area for these species. The DNH encourages TVA to seek a location for the substation and its associated transmission lines that will not impact these rare species and their associated habitat.

In addition, our review revealed that numerous sinks and karst features are known from the project area. These depressional karst features oftentimes provide specialized habitats for sensitive subterranean life. Please keep in mind that the majority of these geologic features have not been surveyed for rare species and that a lack of records for any particular site is not a statement that rare species are absent from that area. For additional information regarding Tennessee's rare and endangered species or interpretation of Status or Ranks, please visit our website at http://www.state.tn.us/environment/nh/.

The DNH would also like to stress that care be taken to prevent revegetation of the project area with plants listed by the Tennessee Exotic Pest Plant Council as harmful exotic plants. We advocate planting and restoring the impacted areas with native plant species, preferably those found onsite prior to construction activities.

Thank you for the opportunity to comment on the subject proposal and for considering Tennessee's rare species throughout the planning of this project. Should you have any questions, please do not hesitate to contact me at (615) 532-0440.

Sincerely,

Kirstin Condict, Data Manager

5/4/2006

Rare Species Documented Within 4-Mile Radius
Proposed Rutherford 500-kV Substation Sites

Tennessee Division of Natural Heritage
www.state.tn.us/environment/nh/

		Federal Status	State Status	Global Rank	State Rank
Vascular Plant					
Arabis hirsuta	Western Hairy Rockcress		T	G5	S1
Arabis perstellata	Braun's Rockcress	LE	E	G2	S1
Aster praealtus	Willow Aster		E	G5	S1
Astragalus bibullatus	Pyne's Ground-plum	LE	E	G1	S1
Astragalus tennesseensis	Tennessee Milk-vetch		S	G3	S3
Carex davisii	Davis' Sedge		S	G4	S1
Echinacea tennesseensis	Tennessee Coneflower	LE	E	G2	S2
Eleocharis compressa	Flat-stemmed Spike-rush		S	G4	S1
Evolvulus nuttallianus	Evolvulus		S	G5	S3
Leavenworthia exigua var. exigua	Glade-cress		S	G4T3	S3
Neviusia alabamensis	Alabama Snow-wreath		T	G2	S2
Phlox bifida ssp. stellaria	Glade Cleft Phlox		T	G5?T3	S3
Schoenolirion croceum	Yellow Sunnybell		T	G4	S3
Talinum calcaricum	Limestone Fame-flower		S	G3	S3
Nonvascular Plant					
Cololejeunea ornata	Ornate Cololejeunea		T	G2G4	S1
Lejeunea sharpii	Sharp's Lejeunea		E	G1G2	S1S2
Vertebrate Animal					
Ambystoma barbouri	Streamside Salamander		D	G4	S2
Gyrinophilus palleucus	Tennessee Cave Salamander		T	G2G3	S2
Notropis rupestris	Bedrock Shiner		D	G2	S2
Typhlichthys subterraneus	Southern Cavefish		D	G4	S3
Invertebrate Animal					
Pseudanophthalmus acherontis	Echo Cave Beetle			G1	S1S2

William W. Overton
Stewardship Chairman
Southeastern Cave Conservancy, Inc.
4209 Gourley Rd
Pegram, TN 37143

SOUTHEASTERN CAVE CONSERVANCY
Management·Conservation·Education

25 April 2006

Steve Pitt
Engineer
c/o TVA
1101 Market Street
Chattanooga, TN 37402-2801

Dear Mr. Pitt,

The Southeastern Cave Conservancy, Inc. (SCCi) is a tax-exempt not-for-profit corporation dedicated to cave conservation, ownership, and management in the Southeastern United States. Incorporated in 1991, the SCCi has grown to become the largest cave and karst conservancy in North America, with twenty five karst preserves located in six states and containing more than fifty caves.

One of our most sensitive and important cave preserves – indeed, one of the most sensitive and important caves in Tennessee – lies directly in the path of the proposed Rutherford, Williamson, and Davidson Counties, Tennessee Proposed Power System Improvements. This letter is in response to these proposed system improvements. While we do not argue the needs of the community for additional electrical power, we do have serious concerns about the location of the proposed transmission lines and the protection of the sensitive surface and cave life on our property.

The primary activities of the SCCi include the acquisition, ownership, protection, and management of significant caves in the Southeast United Sates. Potential acquisitions are carefully evaluated before a purchase is considered. Presence of endangered plants like the Limestone Flameflower (*Talinum calcaricum)* or animals such as the Tennessee Cave Salamander (*Gyrinophilus palleucus*), significant geological and hydrological features, wilderness quality, threats from development or exploitation, and access issues all play a role in the evaluation process. The SCCi is particularly interested in biologically significant caves which are threatened with destruction or closure or those which provide a habitat for endangered species such

as the Grey Bay, Tennessee Cave Salamander, or Harts Tongue Fern. Our mission is to preserve caves and cave environments and to manage them responsibly. For all these reasons and more, we purchased our 88-acre Snail Shell Cave Preserve property near Murfreesboro in Rutherford County, Tennessee in 2002.

Snail Shell Cave is one of the most biologically significant cave sites in the Southeastern United States and is recognized the world over for its importance. It was designated as one of the Top Ten Threatened and Endangered Karst Ecosystems by the Karst Waters Institute in 1999, and is widely recognized as one of the major biodiversity hot spots in the southeastern US. A sigh of relief was felt by cavers, biologists, geologists, and hydrologists upon the acquisition by SCCi of this property, which contains the main entrance and the heart of this 12-mile-long cave system.

Though we recognized a number of primary threats to the cave including trespassing and vandalism, logging, and factors related to the encroaching sprawl and development from the nearby city of Murfreesboro, we did not anticipate construction of a power transmission line on the property. This letter is written in order to share with you our concerns related to the proposed TVA options #4, #5, #6, #8 and #9 and to offer some possible ways to address those concerns.

Of the proposed routes, option #4 is the most alarming to us. Our primary objection is that the proposed route appears to run within a few hundred feet of the main entrance to the cave system, a 150-foot wide 80-foot deep karst window containing and exposing a major underground stream. Construction of the proposed power line would involve clear cutting, grading, heavy equipment use, drilling, and possible use of explosives all directly on top of the underlying cave passages and waterways and in close proximity to the cave entrance. Any one of these could have a substantial negative impact on the cave, or worse, provide direct access into the cave for runoff and silt by opening an unknown sink. No one knows what may happen with blasting in a karst environment. Further, in some areas the overburden above known cave passages is very thin and the cave passages below are very large, creating a serious risk of sinkhole collapse beneath construction equipment. The safety issues alone warrant serious consideration of alternative routes.

With limited overburden – in some places less then ten feet – construction of the pole platforms could cause devastating collapse, drilling could open new and unwanted drainage into the system, and clearing or grading would almost certainly cause silt to enter the cave via cracks now covered with soil and groundcover, degrading stream quality and damaging aquatic life in the cave. Maintenance of the route would almost certainly involve chemicals that would run throughout the entire cave system and could have substantial negative impacts on cave life.

Snail Shell Cave is home to approximately ten unique species of plants and animals, some endangered, some threatened, and several of special concern. All have little if any tolerance to disruption of their delicate environment. Even if no immediate harm comes from the construction phase of this project, the long term maintenance of the right away and transmission lines still raise major concerns. If herbicides are used for control of vegetation, runoff and overspray will certainly enter the entrance sink and cave system. The protected plant life would certainly be damaged but the aquatic life in the cave has no tolerance for these chemicals. Even if the process is carefully regulated, some spills and overspray are inevitable. Any substantial spill could be disastrous.

Keeping the transmission lines away from the cave and its sensitive aquatic life is paramount. Sadly, accidents do happen, spills occur, and the unexpected will eventually come to pass. Once damaged, this cave system of worldwide biological significance can never be returned to its current condition. That would be a loss beyond words. We strongly urge you to relocate the proposed transmission lines to an area far enough from the cave system to provide an adequate buffer against potential damage. We have information including hydrologic studies and maps of the cave and its passages, and will be glad to make these available to you.

In order to avoid Snail Shell Cave and its associated drainage area, the transmission line route of Option #4 would have to be moved north almost to Windrow and further east to Overall Springs.

Options #5, #6, #8 and #9 run over the recharge area and some upstream passages of the cave system as well. As a result, many of the same concerns noted for option #4 exist for those options as well. The recharge area draining into the cave system covers much of the area directly north of Concord and west Rockvale. Moving the transmission line south would be required to avoid the recharge area and cave passages.

When dealing with any endangered, threatened, or protected species, as well as when considering worker safety, it is always better to err on the side of caution. We strongly urge TVA to consider locating the proposed line as far from the cave as possible in order to provide an appropriate buffer for site protection and to avoid the possibility of sinkhole collapse during construction.

With future development almost certain and the customary practice of running new services alongside of existing ones, the need for such a buffer is obvious – construction of the proposed line on top of the cave will lead to its destruction, and may lead to worker injury or even loss of life. While these requested moves may seem extreme they are actually quite conservative given the possible consequences of building on top of the cave. Consideration of a wider buffer zone is certainly in order.

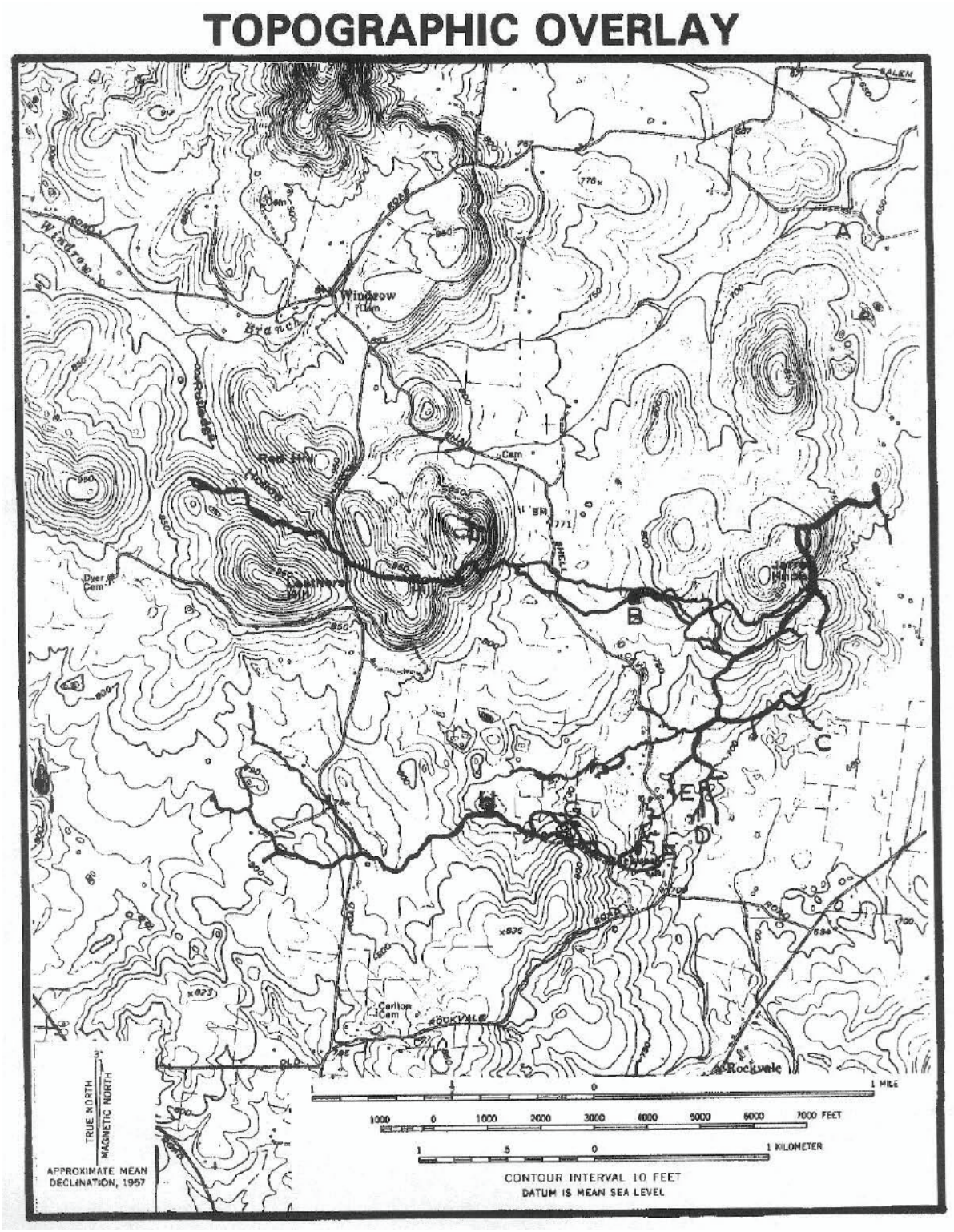
The SCCi will gladly work with TVA to provide access to the cave and surface areas of our property, and to our extensive documentation of its unique plants, animals, geology, and hydrology. I look forward to working with you to address these concerns.

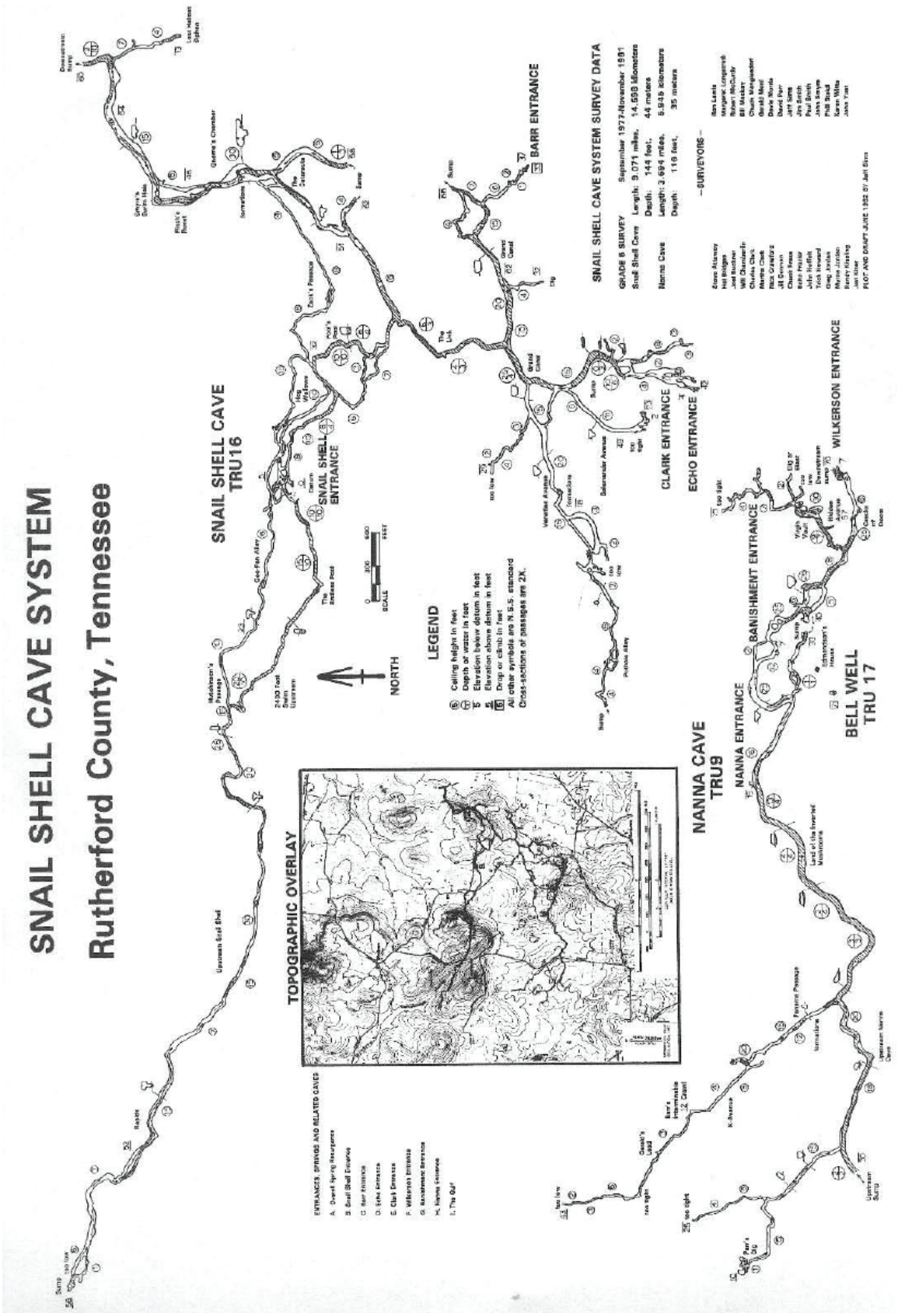
Respectfully,

William W Overton

William W. Overton
Stewardship Chairman
Southeastern Cave Conservancy, Inc
4209 Gourley Rd
Pegram, TN 37143
Phone 615-714-2283
Email boverton@scci.org

TOPOGRAPHIC OVERLAY




SNAIL SHELL CAVE SYSTEM
Rutherford County, Tennessee
SNAIL SHELL CAVE TRU16
NANNA CAVE TRU9
BELL WELL TRU 17
SNAIL SHELL ENTRANCE
BARR ENTRANCE
CLARK ENTRANCE
ECHO ENTRANCE
WILKERSON ENTRANCE
BANISHMENT ENTRANCE
NANNA ENTRANCE
TOPOGRAPHIC OVERLAY
NORTH
LEGEND
SNAIL SHELL CAVE SYSTEM SURVEY DATA
SURVEYORS

THE LAND TRUST FOR TENNESSEE
209 10th Avenue South, Suite 53
Nashville, Tennessee 3720

Charles P. Nicholson
TVA Environmental Policy and Planning
400 West Summit Hill Drive, WT 9B
Knoxville, TN 37902-1401

March 2, 2006

Dear Mr. Nicholson

As you know, The Land Trust for Tennessee assists private landowners and communities to conserve their critical natural and historic resources for future generations. Our main tool to protect these lands is the permanent conservation easement. We are committed to meeting important conservation needs throughout Middle Tennessee and other regions of the state.

We currently hold permanent conservation easements on more than 10,000 acres throughout the state, including Steven and Susan Fisher's Farm, on 6779 Comstock Road, College Grove, Tennessee. This gift of a conservation easement is a significant act by this family to see this historic farm and uniquely situated landscape remain intact and undeveloped.

With our interest in this property, we would like to request that we be included on any future notices regarding TVA possibly running a line through the property in its Rutherford-Williamson-Davidson Power Supply Improvement Project. Please send notices to:

The Land Trust for Tennessee
Attn: Eileen Hennessy
209 10th Avenue South, Suite 530
Nashville, TN 37203

We understand the need of the Tennessee Valley Authority to meet power distribution needs for the region. However, we would like to encourage TVA to look for alternative properties through which to run the line that would lead to less degradation of the scenic, agricultural and water quality resources of the Steven and Susan Fisher family property.

Sincerely,

Jean C. Nelson
President and Executive Director

Phone: (615) 244-5263 **Fax**: (615) 244-6948 **Email**: info@landtrusttn.org **Website Address**: www.landtrusttn.org

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Recreation Educational Services
10th floor - L&C Tower
401 Church Street
Nashville, Tennessee 37243

February 27, 2006

Mr. Jon M. Loney, Manager
Tennessee Valley Authority
Environment Policy and Planning
400 Summit Hill Drive
Knoxville, TN 37902-1401

RE: Tennessee Valley Authority-Preparation of Environmental Impact Statement for Rutherford-Williamson-Davidson Power Improvement Project.

Dear Mr. Loney:

Thank you for including this agency on your review contact list for the above referenced document.

After a research of our office's files, we can locate no occasion where the proposed Rutherford-Williamson-Davidson Power Improvement Project would not impact a grant administrated by this division. Therefore, we have no involvement in the subject area from a state or federal level.

Sincerely,

Mark Tummons, CPRP
Director

MT/lh

Copy: Mr. Charles Nicholson, TVA
Mr. Jim Hammontree, Middle TN, RES PARTAS Consultant

February 15, 2006

Mr. Jon M. Loney
Tennessee Valley Authority
400 West Summit Hill Dr.
Knoxville, Tennessee, 37902-1499

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

Doc. Type: EIS-Admin Record
Index Field: Agency Comment
Project Name: Davidson 500 kV TL
Project Nos: 2007-107

RE: TVA, RUTHERFORD/WILLIAMSON/DAVIDSON 500 KV SUBSTATION AND ASSOCIATED TRANSMISSION LINE UPGRADE, MULTI COUNTY

Dear Mr. Loney:

In response to your request, received on Wednesday, February 8, 2006, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. You have submitted documents that are insufficient for us to complete our review. To complete the Tennessee State Historic Preservation Office review of this undertaking, you will need to provide us with ALL of the following documents unless instructed otherwise by the Tennessee Historical Commission's Review and Compliance Coordinator: Please provide us with ALL of the following documents:

1. A letter requesting Section 106 review of your undertaking that should include: (a) The name of the federal agency funding, licensing, or permitting your undertaking. (b) The name, address, and phone number of the applicant for federal funding, licensing, or permitting. (c) The street address, city, and county of the undertaking. (d) A list of Consulting Parties invited to participate in consultation relative to the undertaking. (e) A USGS 7 1/2 minute topographic map (be sure to include the name of the map) clearly indicating the boundary of the undertaking, the location of all undertaking elements, and the undertaking's Area of Potential Effect. You may obtain such a map by contacting the Tennessee Office of Map Sales at (615) 532-1516.

2. Other suitably scaled maps or site plans as necessary to depict the extent of the undertaking and its locational relationship to its surroundings and environment.

3. A narrative which describes the undertaking in sufficient detail to enable a reader unfamiliar with the undertaking or its location to gain a full understanding of the undertaking and all of its elements and their potential to affect directly and indirectly any historic properties within the Area of Potential Effect.

4. Original chemical or digital photographs of the undertaking Area of Potential Effect that are numbered and clearly keyed to one of the above maps or site plans.

5. Any available information including dates of construction of buildings either inside the undertaking footprint or within view, or sound of the undertaking. Be sure to include photographs of buildings within the undertaking's Area of Potential Effect.

Upon receipt of this documentation, we will complete our review of this undertaking as quickly as possible. Please be advised that until this office has provided you a final written comment on this undertaking, you have not met your Section 106 obligation under federal law. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer
HLH/jyg

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

September 7, 2005

Mr. Jon M. Loney, Manager
NEPA Administration
Environmental Policy and Planning
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1409

RE: Intergovernmental Review – Tennessee Valley Authority – Preparation of Environmental Impact Study for Rutherford—Williamson-Davidson Power Supply Improvement Project

Dear Mr. Loney:

Thank you for the notification of TVA intention to prepare an Environmental Impact Statement (EIS) regarding the proposed construction and operation of a new or expanded 500-kilovolt substation and associated transmission line upgrades in Rutherford, Williamson and Davidson counties.

We contacted Charles Nicholson and discussed the location of any new substation, plus the location of any new power lines. Mr. Nicholson noted that the exact locations of any upgrades or new facilities had not been determined, but explained that TVA was currently looking at three alternatives.

1. A new 500-kV substation in southwest Rutherford County, construction of 25-30 miles of 500-kV transmission lines on vacant right-of -way owned by TVA, and construction of about 22 miles of new 161-kV transmission lines. The proposed transmission lines would be in Rutherford, Maury, and Williamson counties.
2. A new 500-kV substation in northeast Williamson County near Brentwood and upgrading of about 75 miles of 161-kV transmission lines. The transmission lines to be upgraded are in Davidson, Rutherford, Williamson, Sumner, Wilson, Coffee, Franklin, and Bedford counties. The upgrade work could range from replacing the conductors to completely rebuilding the lines.
3. Expansion of TVA's Pinhook 500-kV substation in southwest Davidson County and upgrading of about 115 miles of existing 161-kV transmission lines. These transmission lines are located in Davidson, Rutherford, Maury, Williamson, Coffee, Franklin, and Bedford counties. The upgrade work could range from replacing the conductors to completely rebuilding the lines.

Recreation Educational Services Division*10th Floor, L&C Tower*401 Church Street*Nashville, TN 37243
Phone (615) 532-0748
Fax (615) 532-0778

After a research of our office's files, we can locate no occasion where a grant administrated by this division has been awarded to the subject areas noted above from a state or federal level.

As TVA prepares the scope for the EIS the particular issues that we would like to see addressed in the project area is for TVA to conduct a recreation safety assessment, assess the impact to known recreation areas, assess relationship of project operations and recreation resources within the project area.

Thank you for including this office in your notification of EIS for the above project.

Sincerely,

Mark Tummons, CPRP
Director

MT/lh

Copy: Jim Hammontree, Middle TN PARTAS Consultant

Recreation Educational Services Division*10th Floor, L&C Tower*401-Church Street*Nashville, TN 37243
Phone (615) 532-0748
Fax (615) 532-0778

GREATER NASHVILLE REGIONAL COUNCIL

RECEIVED
Environmental Policy and Planning

August 17, 2005

AUG 2 2 2005

Doc. Type: EIS - Admin. Record
Index Field: Agency Comment
Project Name: Rutherford-Williamson-Davidson
Project No.: 2007-107 500-kV TL

Jon M. Loney, Manager - NEPA Administration
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1401

Re: Intergovernmental Review – TVA - Preparation Of Environmental Impact Statement For Rutherford-Williamson-Davidson Power Supply Improvement Project
GNRC #2006-7

Dear Mr. Loney:

In accordance with the Project Review Process (approved by the Executive Committee at the April 1995 Executive Board Meeting), the Greater Nashville Regional Council has reviewed the above referenced project.

Our evaluation reveals no conflict with existing or proposed planning activities. We are notifying you that your proposal is deemed acceptable on the basis of information now available to this office.

We may wish to comment further at a later time. This letter should be attached to your application. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

Sam H. Edwards
Executive Director

SHE/pyc

501 UNION ST. ¶ SIXTH FLOOR ¶ NASHVILLE, TN 37219 1705 ¶ 615 862-8828 ¶ FAX 615 862-8840 ¶ E-MAIL gnrc@gnrc.org
DAVID G. WALLACE, PRESIDENT ¶ DON TROTTER, VICE PRESIDENT ¶ WILLIAM R. ORANGE, TREASURER ¶ SAM H. EDWARDS, EXECUTIVE DIRECTOR
WEB www.gnrc.org

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
9TH FLOOR, L & C ANNEX, 401 CHURCH STREET
NASHVILLE, TN 37243-1531
TELEPHONE: (615) 532-0554

July 29, 2005

Mr. Tom M. Loney
Manager, NEPA Administration
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1401

Dear Mr. Loney:

I have received your letter dated July 7, 2005 in which you outlined the intent of Tennessee Valley Authority (TVA) to prepare an Environmental Impact Statement (EIS) for the Rutherford-Williamson County Power Supply Improvement project. I have no comments on this project at this time.

Please provide me a copy of the draft EIS when it becomes available.

Thank you for allowing me the opportunity to comment on this project.

Sincerely,

Jackie L. Wappich

for Barry R. Stephens, P. E.
Director

BRS:JLW:gc

STATE OF TENNESSEE
Department of Environment and Conservation
Ground Water Protection
10th Floor, L & C Tower
401 Church Street
Nashville, Tennessee 37243-1540

July 25, 2005

Mr. Jon M. Loney, Manager NEPA Administration
Tennessee Valley Authority
Environmental Policy and Planning
400 West Summit Hill Drive
Knoxville, TN 37902-1401

Re: INTERGOVERNMENTAL REVIEW – TENNESSEE VALLEY AUTHORITY – PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT FOR RUTHERFORD-WILLIAMSON-DAVIDSON POWER SUPPLY IMPROVEMENT PROJECT

Dear Mr. Loney:

The Division of Ground Water Protection regulates all aspects of the subsurface sewage disposal (SSD) program in the State of Tennessee. In this regard, division staff has worked closely with municipalities, government agencies and/or property owners on those construction projects, where it is anticipated that the project will potentially impact existing SSD systems.

Regarding the above referenced project, the Division of Ground Water Protection anticipates that the RUTHERFORD-WILLIAMSON-DAVIDSON POWER SUPPLY IMPROVEMENT PROJECT may impact existing SSD systems. If it becomes apparent that staff assistance will be requested on this project, we ask that they be given adequate prior notice to allow for scheduling of the additional workload.

If you have any questions or think that assistance will be requested on this project, you should contact the following individuals for their respective counties of jurisdiction: Mr. Tom Carlton for Rutherford County at 615-687-7030; Mr. Larry Robinson for Williamson County at 615-790-5717 and Mr. Spencer Hissam for Davidson County at 615-340-5604.

Sincerely,

Kent Taylor, Director
Division of Ground Water Protection

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
3701 Bell Road
NASHVILLE, TENNESSEE 37214

July 21, 2005

REPLY TO
ATTENTION OF:
Regulatory Branch

SUBJECT: File No. 2005-01629; Tennessee Valley Authority Proposed Power Supply Improvement Project in Rutherford, Williamson and Davidson Counties, Tennessee

Mr. Jon M. Loney
TVA, Manager, NEPA Administration
Environmental Policy and Planning
400 West Summit Hill Drive
Knoxville, TN 37902-1401

Dear Mr. Loney:

This is in response to your letter requesting Corps of Engineers comments concerning the proposed power supply improvement project. Please refer to File No. 2005-01629 in any future correspondence with us concerning this project.

Your proposed project was reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act of 1899 requires that a Department of the Army (DA) permit be obtained for certain structures or work in or affecting navigable waters of the United States (U.S.), prior to conducting the work (33 U.S.C. 403). Section 404 of the CWA requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work (33 U.S.C. 1344).

Your letter did not indicate if any waters and/or wetlands would be impacted by the construction (i.e. crossings) of the proposed improvements. Please note that any wetlands and streams in your project area may be considered waters of the United States pursuant to Section 404 of the CWA. However, your proposed plan lacks the necessary information sufficient for a determination whether a permit is required.

My preliminary jurisdictional determination is that a DA permit would likely be required for the work proposed in your request. When available, please provide detailed plans of any proposed impacts to waters of the US and a location map on 8½" x 11" sized paper.

Therefore, we encourage an alignment and construction plan that would avoid wetland and stream impacts wherever possible. Also, we would request that you avoid impacts to the floodplain and riparian

vegetation to the extent possible. Your application should include plans of the work, locations of all crossings, wetland delineations if available, any proposed mitigation, and any supporting environmental documentation.

The Nashville District is available to participate in any onsite inspections of the proposed site and/or attend pre-application meetings to discuss aquatic resource impact avoidance and minimization.

Thank you for including this office in your scoping process. If we can be of further assistance or if you have any questions regarding DA permit requirements, please contact me at the above address, telephone 615-369-7506.

Sincerely,

Kathleen J. Kuná
Project Manager
Operations Division

July 15, 2005

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

Mr. Jon M. Loney
Tennessee Valley Authority
400 West Summit Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, RUTHERFORD-WILLIAMSON-DAVIDSON POWER SUPPLY, UNINCORPORATED, MULTI COUNTY

Dear Mr. Loney:

In response to your request, received on Tuesday, July 12, 2005, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

Considering available information, we find that the project as currently proposed MAY AFFECT PROPERTIES THAT ARE ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. You should continue consultation with our office, designated consulting parties and invite them to participate in consultation, and provide us with appropriate survey documentation for review and comment. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

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Appendix C – Tennessee Valley Authority/Power Distributors Energy Efficiency Initiatives

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Appendix C - Tennessee Valley Authority/Power Distributors Energy Efficiency Initiatives

I Introduction

TVA has a strong track record in promoting and demonstrating the wise use of energy. TVA and the distributors of TVA power have pursued such programs as part of their role as leaders in public power, and we are continuing to explore opportunities to expand energy efficiency and peak load reduction under the new Strategic Plan. From 1997 to 2007, TVA programs have yielded a cumulative peak demand reduction of over 500 MW.

These programs include:

- *energy right*®, Energy Services Company (ESCO), and geothermal programs
- On-site energy consulting with directly served customers, such as GM's Saturn Plant
- Energy audits and educational activities

Among the most successful ways in which TVA leads the industry in the wise use of electricity is the *energy right* Residential Program that was launched in 1996. By 2000, TVA achieved approximately 150 MWs of peak load reduction Valley-wide through implementation of the *energy right* initiatives. These initiatives promote high efficiency HVAC systems, better thermal envelopes, and other measures that save energy and reduce peak demand for Valley residents. The impacts from these programs are expected to grow steadily with continued annual participation.

In addition, the Direct Load Control (DLC) Program provides approximately 50 MW of peak load reduction yearly through the cycling of residential water heaters and air conditioners by radio signal. This program offers Middle Tennessee homeowners incentives in return for allowing their appliances to be switched off remotely for short periods during peak loads. Such programs offer significant potential for energy management.

II Program Descriptions

The following sections provide brief explanations of today's programs that contribute to TVA's energy efficiency measures.

II.I *energy right* Programs

- **Residential Heat Pump Retrofit Program -** promotes quality installations of higher efficiency heat pumps by members of the Quality Contractor Network.
- **Residential New Homes Program -** promotes higher efficiency thermal envelope standards and quality construction in new homes and the installation of energy efficient heat pumps. Provides training for home builders and trade allies to ensure proper installation of energy efficiency measures.
- **Residential Manufactured Homes Program -** focuses on achieving improvements in the HVAC and thermal envelope components of manufactured housing. Program requires that the home be equipped with an energy efficient heat pump.

- **Student Audit -** provides students with a package to fill out and conduct home audit. Students return the audit through the school for analysis, and recommendations are made for energy efficiency implementation measures.

II.II Energy Services Company (ESCO)

Another popular TVA/Power Distributor program is ESCO for schools, local government, businesses, and industries. This program lowers the customer's energy use, making businesses more competitive and helping TVA reduce peak loads on its power system. The ESCO initiative provides technical expertise, turnkey project implementation and management, and third-party financing to assist commercial and industrial (C&I) customers with energy efficiency upgrades and operational improvements.

II.III Large Commercial and Industrial Services

The Large Commercial Program works to improve the efficiency and reduce the owning and operating costs of schools, restaurants, and other large commercial facilities. The Industrial Services Program develops energy solutions to industrial, environmental, productivity, and product process quality problems for Valley industries. Some examples are found below.

- **Commercial Geothermal Heat Pump Program -** Through a combination of offerings, including geothermal heat pump installations, the Large Commercial Program has successfully reduced energy consumption for hundreds of businesses and schools throughout the region. TVA/Power Distributor support for geothermal heat pumps has been instrumental in implementing this energy efficient technology throughout the region. During the last 10 years, TVA has helped owners, architects, and engineers apply geothermal heat pumps at nearly 300 commercial building projects, most of them schools.

- **Energy Management Assistance -** TVA has partnered with General Motors (GM) to assist with energy conservation at the GM Spring Hill, Tennessee, manufacturing facilities. Since 1998, a TVA specialist has been located on site to help plant personnel develop and implement a comprehensive energy management program. TVA has assisted through a variety of services to significantly reduce the electric demand and energy usage, as well as other utilities such as natural gas and compressed air usage. Efforts have included lighting and compressed air leak studies, energy audits, electric, natural gas, and compressed air demand monitoring and charting.

II.IV Energy Audits

TVA provides energy audits through a distributor partnership program. This partnership initiative brings TVA engineering and technical resources to commercial and industrial customers. The program surveys energy use patterns and recommends energy efficiency improvements in numerous areas, but information is not available on actual implementation.

III. Other Initiatives

In fiscal year (FY) 2002, Pacific Energy Associates (PEA) was contracted by TVA to assess a number of demand-side management (DSM) options that could achieve up to 250 MW of peak demand reduction in a two-year period. The assumptions and findings of this study were applied to the Middle Tennessee area in order to determine load reduction potential in the area. The following table includes the findings of the original study, as well as a

percentage applied to the affected service area based on the original assumptions of the study.

Customers	Assumptions, PEA Study, TVA System-Wide1	Actual, Middle Tennessee Service Area2	% TVA Total in Middle Tennessee Area
Residential Customers	3,547,242	188,410	5
C&I <50 kW	558,749	23,012	4
C&I >50 kW	62,796	3,477	6
C&I >5,000 kW	476	6	1
Megawatts	**Findings, PEA Study, TVA System-Wide[3]**	**Findings Applied to Middle Tennessee Area[4]**	
Average MW	92	5.1	
Peak MW	187	10.5	

[1] Source: Total Valley distribution, June 2002; may be slightly higher than numbers reported to PEA
[2] Source: 2007 Tennessee Valley Public Power Association Membership Directory; data compiled in October 2006 distributor survey
[3] Data from actual PEA report FY02
[4] Applied using percentage of actual customers

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Appendix D – Score and Rank Evaluations for Alternative Substation Sites and Transmission Line Routes

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Table D-1. Score and Rank Evaluation of Alternative Substation Sites

	SITE SIZE SUITABILITY	SITE ACREAGE	FLOODPLAIN - ACRES	DISTANCE TO PAVED ROADS	SITE DRAINAGE	SOILS FOR GRADING (SOIL TYPE)	SUITABILITY FOR FOUNDATIONS	CLEARING	CUT AND FILL	HOUSES within 1/2 mile	HOUSES within 1 mile	NEAREST WETLAND	AQUATIC TOUCHED	IMPACT ON PRIME FARMLAND	IMPACT ON FEDERALLY OR STATE-LISTED SPECIES	IMPACT ON CULTURAL	NUMBER OF TRACTS	CURRENT LAND USE	VISUAL IMPACT
Substation 1	1.00	1.00	0.00	2.00	1.00	3.00	3.00	1.00	1.00	9.00	38.00	2.00	2.00	3.00	1.00	3.00	1.00	3.00	2.00
Substation 2A	1.00	1.00	0.00	2.00	1.00	1.00	2.00	1.00	2.00	6.00	46.00	2.00	1.00	2.00	2.00	3.00	1.00	1.00	1.00
Substation 4	1.00	2.00	0.00	2.00	1.00	2.00	2.00	1.00	1.00	10.00	54.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	1.00
Standard Deviation	0.00	0.47	0.00	0.00	0.00	0.82	0.47	0.00	0.47	1.70	6.53	0.00	0.47	0.47	0.47	0.47	0.00	0.82	0.47
Average-Standard	1.00	0.86	0.00	2.00	1.00	1.18	1.86	1.00	0.86	6.63	39.47	2.00	1.20	1.86	1.20	2.20	1.00	1.18	0.86
Average+Standard	1.00	1.80	0.00	2.00	1.00	2.82	2.80	1.00	1.80	10.03	52.53	2.00	2.14	2.80	2.14	3.14	1.00	2.82	1.80
Average	1.00	1.33	0.00	2.00	1.00	2.00	2.33	1.00	1.33	8.33	46.00	2.00	1.67	2.33	1.67	2.67	1.00	2.00	1.33

Calculation of Impact Score																			
Substation 1	1	2	1	1	1	4	4	1	2	3	1	1	3	4	1	3	1	4	4
Substation 2A	1	2	1	1	1	1	2	1	4	1	2	1	1	2	3	3	1	1	2
Substation 4	1	4	1	1	1	2	2	1	2	3	4	1	3	2	3	1	1	2	2
WEIGHT	**2**	**2**	**1**	**2**	**3**	**6**	**6**	**2**	**6**	**6**	**5**	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**
Substation 1	2	4	1	2	3	24	24	2	12	18	5	3	9	12	3	6	2	8	8
Substation 2A	2	4	1	2	3	6	12	2	24	6	10	3	3	6	9	6	2	2	4
Substation 4	2	8	1	2	3	12	12	2	12	18	20	3	9	6	9	2	2	4	4

Calculation of Impact Score	Substation
Substation 1	42
Substation 2A	31
Substation 4	37

	SCORE	
SCORE/RANK	**Substation**	**RANK**
Substation 1	148	3
Substation 2A	107	1
Substation 4	131	2

Table D-2. Score and Rank Evaluation of Alternative Transmission Routes

Route	Route Score					Route Rank				
	Engineering	Environmental	Land Use	Cultural	Total Length	Engineering	Environmental	Land Use	Cultural	Rank
Route 1	36	123	56	39	254	4	7	21	7	8
Route 2	39	120	64	41	264	5	6	28	14	12
Route 3	35	123	50	39	247	2	7	13	7	4
Route 4	41	117	53	41	252	7	3	16	14	6
Route 5	29	115	43	39	226	1	2	5	7	1
Route 6	35	109	48	39	231	2	1	7	7	2
Route 7	46	127	51	42	266	11	12	14	16	14
Route 8	57	124	54	45	280	31	9	19	22	21
Route 11	46	127	40	42	255	11	12	3	16	9
Route 12	58	124	48	45	275	32	9	7	22	17
Route 13	46	127	40	42	255	11	12	3	16	9
Route 14	58	124	48	45	275	32	9	7	22	17
Route 15	40	118	38	40	236	6	4	1	11	3
Route 16	50	118	38	45	251	19	4	1	22	5
Route 39	54	143	69	45	311	26	25	33	22	31
Route 40	59	146	69	45	319	34	29	33	22	34
Route 41	53	144	64	45	306	24	27	28	22	28
Route 42	53	153	64	45	315	24	33	28	22	33
Route 43	54	143	68	45	310	26	25	31	22	30
Route 44	54	146	68	45	313	26	29	31	22	32
Route 45	52	147	58	45	302	21	31	22	22	27
Route 46	52	153	58	45	308	21	33	22	22	29
Route 47	48	137	61	43	289	17	19	26	20	23
Route 48	48	140	61	43	292	17	22	26	20	24
Route 49	46	135	51	45	277	11	18	14	22	20
Route 51	54	141	60	37	292	26	23	25	6	24
Route 52	54	141	55	35	285	26	23	20	3	22
Route 53	52	148	58	42	300	21	32	22	16	26
Route 55	46	131	53	35	265	11	16	16	3	13
Route 56	46	137	53	35	271	11	19	16	3	16
Route 57	44	138	48	40	270	9	21	7	11	15
Route 58	44	144	48	40	276	9	27	7	11	19
Route 59	50	128	48	29	255	19	15	7	1	9
Route 60	43	132	43	34	252	8	17	5	2	6

Appendix E – Tennessee Valley Authority Site Clearing and Grading Specificiations

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Appendix E – Tennessee Valley Authority Site Clearing and Grading Specifications

1. General - The project manager with the clearing and/or grading contractor(s) shall review the environmental evaluation documents for the project or proposed activity (checklist, EDR, EA or EIS) along with all clearing and construction appendices, conditions in applicable general and/or site specific permits, the storm water pollution prevention plan, open burning or demolition notification requirements and any TVA commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and storm water management practices as outlined in TVA's BMP manual (Revised 2000 version). The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible. The BMPs shall be installed before general site clearing, before grading the site, and progressively stabilization BMPs shall be applied from the perimeter toward the interior work areas as grading is completed. Any stabilized area that must be disturbed in subsequent steps shall be protected by temporary BMPs again until work is completed and the area is restabilized.

   If the contractor fails to use best management practices or to follow environmental expectations discussed in the prebid, prework meeting or present in contract specifications, TVA will order corrective changes and additional work, as deemed necessary in TVA's judgment, to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and anti-pollution laws, regulations, and ordinances, including, without limitation, all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. He or she shall secure, or ensure that TVA has **secured, all necessary permits and authorizations and made all appropriate notifications** to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and **any necessary certifications of trained employees knowledgeable of environmental requirements shall be documented** with copies submitted to TVA's project manager or environmental specialist before work begins. The **contractor and subcontractors will be responsible for meeting all** conditions **specified in permits.** Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible in areas not to be developed for buildings, structures, or foundations. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface or ground water. The placement of erosion/sediment controls shall begin at the perimeter and work progressively to the interior of the site. Repeated work in an area will require establishment of a ground cover immediately after each disturbance is completed. In areas outside the clearing, borrow, fill, or use, and access areas, the natural vegetation shall be protected from damage. The contractor and his or her employees and subcontractors must not deviate from delineated access routes or use areas, and must enter the

site(s) at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer zones shall be observed and the methods of clearing or reclearing, grading, borrow or fill modified to protect the buffer and sensitive area. Some areas may require planting native low growing plants or grasses to meet the criteria of regulatory agencies, Executive Orders or commitments to special program interests.

4. Stream side Management Zones - The clearing and/or grading contractor(s) must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet weather conveyances thereto. . In such stream side management zones (SMZ), tall growing tree species (trees that would interfere with TVA's National Electric Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low growing trees identified by TVA as marginal electrical clearance problems may be cut, then stump treated with growth regulators to allow low, slow growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from the TOM organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the access or site is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be prevented from falling into water bodies or immediately removed from streams, ditches, ponds, and wet areas using methods which will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs, and consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Under story trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" under story species and allow them to quickly grow to "electrical clearance problem" heights. In many circumstances herbicides labeled for water and wetland use may be used in reclearing.

At substation, switching stations, and communications sites wetlands **must be avoided.**

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological or historical significance are discovered during clearing, grading, borrow or fill operations, the activity shall immediately cease within a 100-foot radius, and a TVA project manager and environmental specialist and the TVA Cultural Resources Program Manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing, grading, borrow and fill and/or disposal activities shall be performed using best management practices that will prevent erosion and entrance of spillage, contaminants, debris, and other pollutants or objectionable materials into drainage ways, surface waters or ground water. Special care shall be exercised in refueling

equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream or other water body. Open burning debris shall be kept away from streams and ditches and shall be incorporated into the soil. Only materials allowed to be burned under an open burning permit may be incorporated into the soil.

The clearing and grading contractor(s) and subcontractors will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any steam, wetland or other water body. BMPs will be inspected, by the TVA field engineer or other designated TVA or contractor personnel, routinely and at least as frequently as required by the permit or good management practices, and during periods of high runoff; any necessary repairs will be made as soon as practicable. BMP runoff sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling will be maintained onsite, and copies of inspection forms and sampling results will be forwarded to the TVA environmental specialist.

8. Turbidity and Blocking of Streams - If temporary clearing, grading, borrow or fill activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. In Tennessee conditions of an Aquatic Resource Alteration Permit shall be met. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, borrow, fill, or right-of-way disturbance; and after sequential disturbance of stabilized areas due to stepwise construction requirement in accordance with applicable permit or regulatory requirements.

   On rights-of-way mechanized equipment shall not be operated in flowing water except when approved; and then only to construct necessary stream crossings under direct guidance of TVA.

Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA design or construction access road standards. At any construction site material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris which enters streams or other water bodies shall be removed immediately. Appropriate Corps of Engineers and state permits shall be obtained for stream or wetland crossings.

9. Air Quality Control - The clearing or grading contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to be well within the limits of clearing or burning permits and/or Forestry or local fire department requirements. All operations must be conducted in a manner which prevents nuisance conditions or damage to adjacent land, crops, dwellings, highways or people. If building renovation or demolition is involved the required air quality organization shall be notified the minimum 10 days in advance, and if the start date is delayed, renotified to start the clock again.

10. Dust and Mud Control - Clearing, grading, borrow, fill, or transport activities shall be conducted in a manner which minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud on to the public road.

11. Burning - The Contractor shall obtain applicable permits and approvals to conduct controlled burning. The Contractor will comply with all provisions of the permit, notification or authorization including burning site locations, controlled draft, burning hours, and such other

conditions as stipulated. If weather conditions such as wind speed or wind direction change rapidly, the Contractor's burning operation may be temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner which produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The Contractor will properly store and handle combustible and volatile materials which could create objectionable smoke, odor, or fumes. The Contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The Contractor shall maintain and operate equipment in a manner which limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturer's recommended limits and tolerances. Excessive exhaust gases will be eliminated and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of personnel vehicles will not be performed on the site, right-of-way, or access route. However, if emergency or “have to” situations arise, minimal/temporary maintenance to personnel vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment may have to be serviced on the right-of-way, site, or access route, except in designated sensitive areas. The clearing, grading, borrow, or fill contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the Area Environmental Program Administration or project manager will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The Contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing, grading, borrow, fill, or construction contractor shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party and at each construction step. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing, grading, borrow, fill, or construction contractor and subcontractor(s) shall be responsible for daily cleanup and proper labeling , storage and disposal of all refuse and debris on the site produced by his or her operations and employees. Facilities which meet applicable regulations and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used. Records of waste generation shall be maintained for a site and shall be provided to the project manager and environmental specialist assigned to the project.

19. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractors contract to remove as they wish. Trees may be removed from the site for lumber or pulp wood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer and the open burning permits, notifications and regulatory requirements must be met. On rights-of-way trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way, site, or access.

    Trees that have been cut may not be left on a substation, switching station, or communications site.

20. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line, site, or communications facilities construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's "A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities." Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor with emphasis on using landscaping materials provided in guidelines for low maintenance native vegetation use.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

    E. Vegetation designated by the Federal Invasive Species Council must be eliminated at the work site and equipment being transported from location to location must be inspected to ensure removal and destruction of live material.

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Appendix F – Tennessee Valley Authority Right-of-Way Clearing Specificiations

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Appendix F – Tennessee Valley Authority Right-of-Way Clearing Specifications

1. General - The clearing contractor shall review the environmental evaluation documents (categorical exclusion checklist, environmental assessment, or environmental impact statement) for the project or proposed activity, along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and management practices as outlined in TVA's best management practice (BMP) manual (Muncy 1992, and revisions thereto). The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible.

   If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid or prework meeting or present in contract specifications, TVA will order corrective changes and additional work as deemed necessary in TVA's judgment to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances including without limitation all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. The contractor shall secure or ensure that TVA has secured all necessary permits or authorizations to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and any necessary certifications of trained or licensed employees shall be documented with copies submitted to TVA's right-of-way inspector or construction environmental engineer before work begins. The contractor will be responsible for meeting all conditions specified in permits. Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The clearing contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface water or groundwater. In areas outside the clearing, use, and access areas, the natural vegetation shall be protected from damage. The contractor and his employees must not deviate from delineated access routes or use areas and must enter the site at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer

zones shall be observed and the methods of clearing or reclearing modified to protect the buffer and sensitive area. Some areas may require planting native plants or grasses to meet the criteria of regulatory agencies or commitments to special program interests.

4. Streamside Management Zones - The clearing contractor must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZ), tall-growing tree species (trees that would interfere with TVA's National Electric Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut, and then stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from TVA's Transmission, Operations, and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the right-of-way is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be immediately removed from streams, ditches, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" understory species and allow them to grow quickly to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological significance are discovered during clearing or reclearing operations, the activity shall immediately cease within a 100-foot radius, and a TVA right-of-way inspector or construction environmental engineer and the Cultural Resources Program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing and disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage, contaminants, debris, and other pollutants or objectionable materials into drainage

ways, surface water, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris will be kept away from streams and ditches and shall be incorporated into the soil.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

8. Turbidity and Blocking of Streams - If temporary clearing activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, or right-of-way disturbance in accordance with applicable permit or regulatory requirements.

   Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct necessary stream crossings under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed as soon as possible. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream crossings.

9. Air Quality Control - The clearing or reclearing contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land crops, dwellings, highways, or people.

10. Dust and Mud Control - Clearing activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification, or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind speed or wind direction change rapidly, the contractor's burning operation may be

temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturers' recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way, except in designated sensitive areas. The clearing or reclearing contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing contractor shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing or reclearing contractor shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his operations and employees. Facilities that meet applicable regulations

and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used.

19. Brush and Timber Disposal (Reclearing) - The reclearing contractor shall place felled tree boles in neat stacks at the edge of the right-of-way, with crossing breaks at least every 100 feet. Property owner requests shall be reviewed with the project manager or right-of-way specialist before accepting them. Lop and drop activities must be specified in the contract and on plan and profile drawings with verification with the right-of-way specialist before conducting such work. When tree trimming and chipping is necessary, disposal of the chips on the easement or other locations on the property must be with the consent of the property owner and the approval of the right-of-way specialist. No trees, branches, or chips shall remain in a surface water body or be placed at a location where washing into a surface water or groundwater source might occur.

20. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor's contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer, and the open burning permits, notifications, and regulatory requirements must be met. Trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way.

21. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

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Appendix G – Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line, Substation, or Communications Construction

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Appendix G – Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line, Substation, or Communications Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor and subcontractors shall plan, coordinate, and conduct his or her operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting (including clearing and grading or reclearing and removal or dismantling). This specification contains provisions that shall be considered in all TVA and contract construction, dismantling, or forensic operations. If the contractor and his or her subcontractors fail to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all site perimeters, structure, foundation, conduit, grounding, fence, drainage ways, etc., appropriate protective measures to prevent erosion or release of contaminants will be taken immediately upon the end of each step in a construction, dismantling, or forensic sequence, and those protective measures will be inspected and maintained throughout the construction and site stabilization and rehabilitation period.

2. Regulations - TVA and/or the assigned contractor and subcontractor(s) shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor and/or subcontractor(s) use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor and subcontractor(s) shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, site, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission or communication facility. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements and best management practices (BMPs).

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual site, structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground

due to size and function.) Some disking of the right-of-way, access, and site(s) may occur for proper seedbed preparation.
Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the site or around structures except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any anchor, foundation, or its structure.

5. Sanitation - A designated TVA or contractor and/or subcontractor(s) representative shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor and subcontractor(s) personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his or her operations and by his or her employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as wastes. Records of the amounts generated shall be provided to the site's or project's designated environmental specialist. Contractor(s) and subcontractor(s) must meet similar provisions on any project contracted by TVA. Final debris, refuse, product, and material removal is the responsibility of the contractor unless special written agreement is made with the ultimate TVA owner of the site.

7. Landscape Preservation - TVA and its contractor(s) and subcontractor(s) shall exercise care to preserve the natural landscape in the entire construction, dismantling, or forensic area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the access and/or right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, endangered species' habitat, water supply watersheds, and public recreational areas such as parks and monuments. Contractors, their subcontractor(s), and TVA construction crews shall take all necessary actions to avoid adverse impacts to these

sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing, grading, borrow, fill, construction, dismantling, or forensic operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's construction superintendent, project manager, or area environmental program administrator and TVA Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction, dismantling, or forensic activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

   The clearing contractor erected erosion and/or sedimentation control shall be maintained and (when TVA or contract construction personnel are unable) the construction crew(s) shall maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities and at sequential steps of construction at the same location on site. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor and/or subcontractor(s) personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections and any required sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling results will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA project manager or supporting environmental specialist.

   Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the site, access, or right-of-way, on a related construction site or its access roads.

10. Turbidity and Blocking of Streams - Construction, dismantling, or forensic activities in or near streamside management zones or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. **All conditions** of a general storm water permit, aquatic resource alteration permit, or a site-specific permit **shall be met** including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction, dismantling, or forensic activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.*

    On rights-of-way, mechanized equipment shall not be operated in flowing or standing water bodies except when approved and, then, only to construct crossings or to perform required construction under direct guidance of TVA. Construction of stream fords or

other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses, their adjacent wetlands, or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers' and state permits shall be obtained.

Mechanized equipment shall not be operated in flowing or standing water on substation, switching station, or telecommunication sites.

Wastewater from construction, dismantling, or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, pond or conveyed to a sinkhole. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Floodplain Evaluation - During the planning and design phase of the substation or communications facility, floodplain information should be obtained to avoid locating flood-damageable facilities in the 100-year floodplain. If the preferred site is located within a floodplain area, alternative sites must be evaluated and documentation prepared to support a determination of "no practicable alternative" to siting in the floodplain. In addition, steps taken to minimize adverse floodplain impacts should also be documented.

12. Clearing - No construction, dismantling, or forensic activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure, substation, or communication site or access thereto. TVA and the construction, dismantling, or forensic contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed after each disturbance that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

13. Restoration of Site - All construction, dismantling, or forensic-related disturbed areas with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

D. Rehabilitation species shall use species designated by federal guidance that are low–maintenance, native species appropriate for the site conditions that prevail at that location.

E. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

F. The site must be protected from species designated by the federal Invasive Species Council and must not be the source of species that can be transported to other locations via equipment contaminated with viable materials; thus, the equipment must be inspected, and any such species' material found must be removed and destroyed prior to transport to another location.

14. Air Quality Control - Construction, dismantling, and/or forensic crews shall take appropriate actions to minimize the amount of air pollution created by their operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

15. Burning - Before conducting any open burning operations, the contractor and subcontractor(s) shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner on rights-of-way or project manager for TVA sites.

16. RENOVATION OR DEMOLITION DEBRIS MAY NOT BE BURNED.

17. Dust and Mud Control - Construction, dismantling, or forensic activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

18. Vehicle Exhaust Emissions - TVA and/or the contractor(s) and subcontractor(s) shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

19. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way or access route to the site. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order

to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the site except adjacent to or in designated sensitive areas. The Heavy Equipment Department within TVA or the construction, dismantling, or forensic contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Records of amounts generated shall be provided to TVA. Equipment shall not be temporarily stored in stream floodplains whether overnight or on weekends or holidays.

20. Smoke and Odors - TVA and/or the contractor(s) and subcontractor(s) shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor and subcontractor(s) shall not burn refuse such as trash, rags, tires, plastics, or other debris.

21. Noise Control - TVA and/or the contractor and subcontractor(s) shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction, dismantling, or forensic operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

22. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction.* TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

23. Damages - The movement of construction, dismantling, or forensic crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor and subcontractor(s) will be responsible for erosion damage caused by his or her actions and employees and, especially, for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the project to be handled shall be documented with an implementation schedule and a property owner signature obtained.

24. Final Site Cleanup and Inspection - The contractor’s designated person shall ensure that all construction, dismantling, or forensic-related debris, products, materials, and wastes are properly handled, labeled as required, and removed from the site. Upon completion of those activities, that person and a TVA-designated person shall walk down the site and complete an approval inspection.

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Appendix H – Tennessee Valley Authority Transmission Construction Guidelines Near Streams

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Appendix H – Tennessee Valley Authority Transmission Construction Guidelines Near Streams

Even the most carefully designed transmission line project eventually will affect one or more creeks, rivers, or other type of water body. These streams and other water areas are protected by state and federal law, generally support some amount of fishing and recreation, and, occasionally, are homes for important and/or endangered species. These habitats occur in the stream and on strips of land along both sides (the streamside management zone [SMZ]) where disturbance of the water, land, or vegetation could have an adverse effect on the water or stream life. The following guidelines have been prepared to help Tennessee Valley Authority (TVA) Transmission Construction staff and their contractors avoid impacts to streams and stream life as they work in and near SMZs. These guidelines expand on information presented in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities.*

Three Levels of Protection

During the preconstruction review of a proposed transmission line, TVA Environmental Stewardship and Policy staff will have studied each possible stream impact site and will have identified it as falling into one of three categories: (A) standard stream protection, (B) protection of important permanent streams, or (C) protection of unique habitats. These category designations are based on the variety of species and habitats that exist in the stream as well as state and federal requirements to avoid harming certain species. The category designation for each site will be marked on the plan and profile sheets. Construction crews are required to protect streams and other identified water habitats using the following pertinent set(s) of guidelines:

(A) Standard Stream Protection

This is the standard (basic) level of protection for streams and the habitats around them. The purpose of the following guidelines is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

Guidelines:

1. All construction work around streams will be done using pertinent best management practices (BMPs) such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, “Standards and Specifications.”

2. All equipment crossings of streams must comply with appropriate state permitting requirements. Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to

minimize soil disturbance and impacts to the SMZ and surrounding area. Stumps can be cut close to ground level but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as feasible.

(B) Protection of Important Permanent Streams

This category will be used when there is one or more specific reason(s) why a permanent (always-flowing) stream requires protection beyond that provided by standard BMPs. Reasons for requiring this additional protection include the presence of important sports fish (trout, for example) and habitats for federal endangered species. The purpose of the following guidelines is to minimize the disturbance of the banks and water in the flowing stream(s) where this level of protection is required.

Guidelines:

1. Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, “Standards and Specifications.”

2. All equipment crossings of streams must comply with appropriate state (and, at times, federal) permitting requirements. Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Cutting of trees near permanent streams must be limited to those required to meet National Electric Safety Code and danger tree requirements. Stumps can be cut close to ground level but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.

(C) Protection of Unique Habitats

This category will be used when, for one or more specific reasons, a temporary or permanent aquatic habitat requires special protection. This relatively uncommon level of protection will be appropriate and required when a unique habitat (for example, a particular spring run) or protected species (for example, one that breeds in a wet-weather ditch) is known to occur on or adjacent to the construction corridor. The purpose of the following guidelines is to avoid or minimize any disturbance of the unique aquatic habitat.

Guidelines:

1. Except as modified by Guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, "Standards and Specifications."

2. All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat. All crossings of streams also must comply with appropriate state (and, at times, federal) permitting requirements.

3. Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum. Stumps must not be removed, uprooted, or cut shorter than 0.30 meter (1 foot) above the ground line.

4. Other vegetation near the unique habitat must be disturbed as little as possible during construction. The soil must not be disturbed by plowing, disking, blading, or grading. Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.

Additional Help

If you have questions about the purpose or application of these guidelines, please contact your supervisor or the environmental coordinator in the local Transmission Service Center.

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Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 1)

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
1. Reference	• All TVA construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."	Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."	• Except as modified by guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."
2. Equipment Crossings	• All crossings of streams must comply with appropriate state and federal permitting requirements. • Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.	• All crossings of streams must comply with appropriate state and federal permitting requirements. • Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.	• All crossings of streams also must comply with appropriate state and federal permitting requirements. • All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat.

Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 2)

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
3. Cutting Trees	• Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Stumps can be cut close to ground level but must not be removed or uprooted.	• Cutting of trees with SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Cutting of trees near permanent streams must be limited to those meeting National Electric Safety Code and danger tree requirements. • Stumps can be cut close to ground level but must not be removed or uprooted.	• Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum. • Stumps must not be removed, uprooted, or cut shorter than 1 foot above the ground line.
4. Other Vegetation	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. • Shorelines that have to be disturbed must be stabilized as soon as feasible.	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. • Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.	• Other vegetation near the unique habitat must be disturbed as little as possible during construction. • The soil must not be disturbed by plowing, disking, blading, or grading. • Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.

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Appendix I – Tennessee Valley Authority Power System Operations Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines

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Appendix I – Tennessee Valley Authority Power System Operations Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines

1.0 Overview

A. TVA must manage the vegetation on its rights-of-way (ROW) and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the ROW as well as to trees located off the ROW.

B. Each year TVA assesses the conditions of the vegetation on and along its ROWs. This is accomplished by aerial inspections, periodic field inspections, aerial photography, and information from TVA personnel, property owners and the general public. Important information gathered during these assessments includes the coverage by various vegetation types, the mix of plant species, the observed growth, the seasonal growing conditions and the density of the tall vegetation. TVA also evaluates the proximity, height, and growth rate of trees adjacent to the ROW that may be a danger to the line or structures.

C. TVA ROW Specialists develop a vegetation reclearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.0 ROW Management Options

A. TVA uses an integrated vegetation management approach. In farming areas, TVA encourages property owner management of the ROW using low growing crops. In dissected terrain with rolling hills and interspersed woodlands, TVA uses mechanical mowing to a large extent.

B. When slopes become hazardous to farm tractors and rotary mowers, TVA may use a variety of herbicides specific to the species present with a variety of possible application techniques. When scattered small stands of tall growing vegetation are present and access along the ROW is difficult, or the path to such stands is very long, herbicides may be used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health and Safety Administration. For that reason, TVA is actively looking at better control methods, including use of low volume herbicide applications, occasional single tree injections, and tree growth regulators.

D. TVA does not encourage tree reclearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work. Private property owners may reclear the ROW with trained reclearing professionals.

E. Mechanical mowers not only cut the tall saplings and seedlings on the ROW, they also shatter the stump and the supporting near surface root crown. The tendency of resistant species is to resprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle reclearing with many original stumps regrowing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce regrowth at the rate of 5-10 feet in a year. In years with high rainfall the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

F. TVA encourages property owners to sign an agreement to manage ROWs on their land for wildlife under the auspices of "Project Habitat," a joint project by TVA, BASF, and wildlife organizations, e.g., National Wild Turkey Federation, Quail Unlimited, and Buckmasters. The property owner maintains the ROW in wildlife food and cover with emphasis on quail, turkey, deer or other wildlife. A variation used in or adjacent to developing suburban areas is to sign agreements with the developer and residents to plant and maintain wildflowers on the ROW.

G. TVA places strong emphasis on managing ROWs in the above manner. When the property owners do not agree to these opportunities, TVA must maintain the ROW in the most environmentally acceptable, cost-effective, and efficient manner possible.

3.0 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife, and U.S. Forest Service personnel to explore options for vegetation control. The results have been strong recommendations to use species specific, low volume, herbicide applications in more situations. Research, demonstrations, and other ROW programs show a definite improvement of ROWs treated with selective low volume applications of new herbicides using a variety of application techniques and timing.

B. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations there is increased development of wild flowering plants and shrubs. In

conjunction with herbicides, the diversity and density of low growing plants provide control of tall growing species through competition.

C. Wildlife managers often request the use of herbicides in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber tired equipment).

D. Property owners interested in tree production often request the use of low volume applications rather than hand or mechanical clearing because of the insect and fungus problems in damaged vegetation and debris left on ROW. The insect and fungus invasions, such as pine tip moth, oak leaf blight, sycamore and dogwood blight, etc., are becoming widespread across the nation.

E. Best Management Practices (BMPs) governing application of herbicides are contained within "*A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities",* which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, Environmental Protection Agency (EPA) guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by EPA require application by or under the supervision of applicators certified by the respective state control board. Aerial and ground applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual:

   2. The sites to be treated are selected and application directed by the appropriate TVA official.

   3. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.

   4. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed five miles per hour, in areas of fog, or during periods of temperature inversion.

5. Pellet application will normally not be made when the surface wind speeds exceed ten miles per hour, or on frozen or water saturated soils.

6. Liquid application is not performed when the temperature reaches 95 degrees (F) or above.

7. Application during unstable, unpredictable, or changing weather patterns is avoided.

8. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.

9. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZs) (200 feet minimum width) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.

10. Buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.

11. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits (b) off the right-of-way and (c) during rainy periods or during the 48- hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. Table 1 - Herbicides Currently Used on TVA ROWs

Trade Name	Active Ingredients	Label Signal Word
Accord	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Escort	Metsulfuron Methyl/ dry flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Transline	Clopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Krenite S	Fosamine Ammoinium	Caution
Spike 20P	Tebuthiuron	Caution
Chopper	Imazapyr/RTU	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution

H. Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas on TVA ROWs and Substations

Trade Name	Active Ingredients	Label Signal Word
Topsite	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron and Diuron	Caution
Sahara	Diuron/Imazapyr	Caution

I. Table 3 - Tree Growth Regulators (TGRs) Currently Used on TVA ROWs - TGRs may be used on tall trees that have special circumstances where they must be trimmed on a regular cycle.

TGR	Flurprimidol	Caution
Profile 2SC	TGR-paclobutrazol	Caution

J. TVA currently utilizes Activate Plus, manufactured by Terra, as an adjuvant to herbicides to improve the performance of the spray mixture. Application rates are consistent with the EPA-approved label. U. S. Fish and Wildlife has expressed some concern on toxicity effects of surfactants on aquatic species. TVA is working in coordination with Mississippi State University and chemical companies to evaluate efficacy of additional low-toxicity surfactants, including LI700 as manufactured by Loveland Industries, through side-by-side test plots in the streamside management zones of area transmission lines.

K. The herbicides and TGRs listed above have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the U.S. Forest Service Vegetation Management Environmental Impact Statements and those evaluations are incorporated here by reference. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

L. The rates of application utilized are those listed on the EPA approved label and consistent with utility standard practice throughout the Southeast. TVA currently uses primarily low volume applications of foliar and basal applications of Accord (Glyphosate) and Accord (Glyphosate)-Arsenal (Imazapyr) tank mixes. Glyposate is one of the most widely used herbicidal active ingredients in the world, and has been continuously the subject of numerous exhaustive studies and scrutiny to determine it's potential impacts on humans, animals and the environment.

4.0 Accord

A. Accord is labeled for vegetation management in forestry and utility ROW applications. It has a full aquatics label, and can be applied to emergent weeds in all bodies of fresh and brackish water. There is limited restriction on the use of treated water for irrigation, recreation or domestic purposes. Accord is applied to the foliage of actively growing plants. The active ingredient is absorbed through the leaves and rapidly moves throughout the plant. Glyphosate prevents the plant from producing amino acids that are unique to plants and which are building blocks of plant proteins. The plant, unable to make proteins, stops growing and dies.

B. The favorable environmental fate characteristic of Accord herbicide and its major metabolite (breakdown product) aminomethylphosphonic acid (AMPA) is well known. Continuing research is underway with more than 400 studies conducted to date in the laboratory and under field use conditions. These studies show rapid breakdown, little soil or plant debris retention and little vertical movement into soil below the surface.

C. Glyphosate is naturally degraded by microbes in soil and water under both aerobic (with oxygen) and anaerobic (without oxygen) conditions. AMPA is further degraded in soil and sediments to: phosphorus, nitrogen, hydrogen and carbon dioxide. Glyphosate binds rapidly and completely to a wide range of soils and sediment when introduced into the environment. This essentially eliminates movement in the soil. The average half-life of glyphosate in soils is less than 45 days. Half-life for the dissipation of glyphosate in environmental waters ranges from 1.5 to 14 days.

D. Glyphosate is non-toxic to birds, mammals and bees and has been shown not to bioaccumulate since it acts in plants through an enzyme system that does not exist in animals or humans.

5. Arsenal

A. Arsenal (imazapyr) has been similarly tested and it is found to have low leaching potential in soils. When available on or in the soil it is broken down rapidly by soil microbes to naturally occurring compounds. When not available, Imazapyr is bound tightly to soil colloids and is unavailable for movement. The half-life in soil is 25 to 65 days.

B. Extensive chronic and acute toxicity studies have made Arsenal an EPA classified herbicide as practically non-toxic to humans, mammals, birds, fish, aquatic invertebrates and insects. The chronic studies demonstrate that Imazapyr is non-teratrogenic, non-mutagenic, and not a carcinogen.

C. The mode of action suppresses amino acids of the plant via an enzyme system containing acetohydroxy acid synthase. This enzyme system does not exist in other forms of life including humans and animals.

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Appendix J – Watercourse Crossings Along the Proposed Transmission Line Routes and the Proposed Rutherford Substation Site

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Appendix J – Watercourse Crossings Along the Proposed Transmission Line Routes and the Proposed Rutherford Substation Site

J-1. Stream Crossings Found on the Proposed Rutherford Substation Site Within the Harpeth River Drainage Rutherford County, Tennessee

Stream ID	Stream Category	Category	Stream Name	Field Notes
001S	Intermittent	Category A (50 feet)	Tributary to Nelson Branch	7-foot x 5-foot incised channel; heavy sediment deposits in channel
002S	Intermittent	Category A (50 feet)	Tributary to Nelson Branch	3-foot-wide x 1-foot-deep channel flowing through horse pasture and wetland
003S	Other	Category A (50 feet)	Tributary to Nelson Branch	Pond

J-2. Stream Crossings Within the Duck and Harpeth River Drainages in Rutherford, Williamson, and Maury Counties, Tennessee, Along the Proposed Maury Transmission Line Right-of-Way

Stream ID	Stream Category	Category	Stream Name	Field Notes
001M	Perennial	Category A (60 feet)	Rutherford Creek	80-foot-wide x 15-foot-deep channel; heavy siltation in pool area below centerline
002M	Perennial	Category A (60 feet/ 100 feet)	Rutherford Creek	90-foot-wide x 10-foot-deep channel; mussel relics, fish, macroinvertebrates observed; steep forested slopes located above left descending bank
003M	Perennial	Category A (60 feet)	Rutherford Creek	30-foot-wide channel; mussel relics, fish, macroinvertebrates observed; riparian area is wooded but surrounding areas are pasture
004M	Perennial	Category A (60 feet)	Rutherford Creek	70-foot-wide channel; mussel relics, fish, macroinvertebrates observed; riparian vegetation is intact but surrounding areas are pasture
005M	Perennial	Category A (60 feet)	Rutherford Creek	50-foot-wide channel; mussel relics, fish, macroinvertebrates observed; riparian vegetation is intact but surrounding areas are pasture
006M	Perennial	Category A (60 feet)	Rutherford Creek	Large, 60-foot-wide x 12-foot-deep channel; only right descending bank is in ROW under existing line; stream would be in ROW; mussel relics, fish, macroinvertebrates observed
007M	Perennial	Category A (60 feet)	Rutherford Creek	Feeds 006M (Rutherford Creek); 5-foot x 3-foot stream surrounded by old-field and cropland

Stream ID	Stream Category	Category	Stream Name	Field Notes
008M	Perennial	Category A (60 feet)	Rutherford Creek	Refer to field notes for 006M
009M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	2-foot-wide x 1-foot-deep channel through pasture; little habitat; insects seen; culvert exists
010M	Other	Category A (50 feet)	Tributary to Rutherford Creek	Ponded drainage surrounded by pasture
011M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	1- to 3-foot-wide x 1-foot-deep channel through cow pasture; banks heavily degraded; culverted crossing exists
012M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	1- to 3-foot-wide x 1-foot-deep channel through cow pasture; heavily eroded banks; widening section for crossing through ROW; snails and aquatic insects present
013M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	7-foot-wide x 4-foot-deep channel surrounded by old-field and mown pasture
014M	Intermittent	Category A (60 feet)	Tributary to Rutherford Creek	5-foot-wide x 2- to 3-foot-deep channel; no water flowing in ROW; water emerges from bedrock at north end of ROW; surrounded by old-field
015M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	7-foot-wide x 3-foot-deep channel; homemade bridge in ROW; uncured concrete poured into stream at one time
016M	Perennial	Category A (60 feet)	Tributary to Rutherford Creek	1-foot-wide x 1-foot-deep perennial tributary to 017M; heavily silted due to construction; snails seen; runs through wetland
017M	Perennial	Category A (50 feet)	Tributary to Rutherford Creek	5- to 7-foot-wide x 1-foot-deep channel between road and new subdivision project; heavily silted; fish, crayfish, snails seen
018M	Perennial	Category A (65/50 feet)	Tributary to Crooked Creek	3- to 5-foot-wide x 1- to 2-foot-deep channel running through mowed current and future residential area; large culvert and new road to new subdivision exists; fish seen
019M	Perennial	Category A (60 feet)	Tributary to Crooked Creek	2-foot-wide x 1-foot-deep channel; culvert on ROW access road
020M	Perennial	Category A (60 feet)	Crooked Creek	2-foot-wide x 1-foot-deep channel culverted at ROW access road
021M	Perennial	Category A (60 feet)	Crooked Creek	7- to 15-foot-wide x 2- to 3-foot-deep channel; fish, macroinvertebrates, crayfish observed
022M	Perennial	Category A (60 feet)	Tributary to Crooked Creek	2-foot-wide x 1-foot-deep perennial tributary channel to Crooked Creek; frogs, snails present
023M	Intermittent	Category A (60 feet)	Tributary to Crooked Creek	2-foot x 1-foot channel; part of stream complex east of I-65; intersects 024M outside of ROW

Stream ID	Stream Category	Category	Stream Name	Field Notes
024M	Intermittent	Category A (60 feet)	Tributary to Crooked Creek	Stream complex east of I-65; refer to 023M field notes
025M	Perennial	Category A (60 feet)	Tributary to Crooked Creek	4-foot x 1-foot channel in karst area; bedrock substrate prevelant with caddis and amphipods present
026M	Other	Category A (50 feet)	Tributary to Crooked Creek	Small farm pond
027M	Other	Category A (50 feet)	Tributary to Crooked Creek	Farm pond
028M	Intermittent	Category A (60 feet)	Kincaid Branch	4-foot x 1-foot channel; no riparian vegetation present; surrounded by cow pasture and motorcycle track
029M	Intermittent	Category A (60 feet)	Tributary to Carlton Branch	5-foot-wide x 2-foot-deep channel; very little water present; surrounded mostly by pasture
030M	Other	Category A (50 feet)	Tributary to Carlton Branch	Pond
031M	Perennial	Category A (60 feet)	Tributary to Carlton Branch	3- to 5-foot-wide x 1- to 2-foot-deep channel through pasture
032M	Perennial	Category A (60 feet)	Tributary to Carlton Branch	3- to 5-foot-wide x 2- to 3-foot-deep channel; channelized through farm pasture
033M	Other	Category A (50 feet)	Tributary to Carlton Branch	Pond
034M	Other	Category A (50 feet)	Tributary to Carlton Branch	Large farm pond
035M	Perennial	Category A (60 feet)	Tributary to Carlton Branch	2- to 3-foot-wide x 1- to 2-foot-deep channel in cow pasture; snails and aquatic insects present
036M	Perennial	Category A (60 feet)	Tributary to Carlton Branch	1- to 2-foot-wide x 1-foot-deep channel through cow pasture
037M	Perennial	Category B (100 feet)	Tributary to Carlton Branch	2- to 3-foot-wide x 1-foot-deep channel emerging from mouth of cave; aquatic insects present
038M	Intermittent	Category A (50 feet)	Tributary to Comstock Creek	6-foot x 3-foot incised channel; crayfish, amphipods present; ford present downstream of ROW
039M	Intermittent	Category A (50 feet)	Tributary to Comstock Creek	3-foot-wide x 1-foot-deep channel; no water in ROW, but water present up and downstream of ROW; seep is located at southern end of ROW
040M	Intermittent	Category A (100 feet)	Tributary to Comstock Creek	1 foot wide x 1 foot deep; spring seep starts near Centerline and flows north eventually intersecting 041M outside of ROW
041M	Intermittent	Category A (50 feet)	Tributary to Comstock Creek	4-foot-wide x 3-foot-deep channel fed by 040M downstream (south) of ROW
042M	Perennial	Category A (50 feet)	Tributary to Comstock Creek	10-foot x 1-foot channel; fish, aquatic insects, and crayfish present

Stream ID	Stream Category	Category	Stream Name	Field Notes
043M	Perennial	Category A (50 feet)	Comstock Creek	8-foot x 5-foot channel near Comstock Road; fish and macroinvertebrates observed
044M	Perennial	Category A (50 feet)	Tributary to Comstock Creek	30-foot x 2-foot channel adjacent to Comstock Road; fed by 043M downstream of ROW
045M	Other	Category A (50 feet)	Tributary to Hargrove Branch	Farm pond with WWC influence
046M	Intermittent	Category A (50 feet)	Tributary to Boone Creek	10-foot-wide x 3-foot-deep channel running through pasture; riparian vegetation intact but thin; some small pools present
047M	Perennial	Category A (100 feet)	Tributary to Boone Creek	Small active spring feeding perennial stream outside of ROW (barely); SMZ would be in ROW
048M	Intermittent	Category A (50 feet)	Tributary to Boone Creek	10-foot x 5-foot channel running through pasture
049M	Intermittent	Category A (50 feet)	Boone Creek	8-foot x 5-foot channel running through pasture
050M	Other	Category A (100 feet)	Tributary to Cove Branch	Spring on very steep ridge; drinking water source for cabin below
051M	Perennial	Category A (60 feet)	Tributary to Cove Branch	2 foot x 1 foot channel running into farm pond. Snails present.
052M	Perennial	Category A (60 feet)	Tributary to Cove Branch	2 foot x 1 foot channel running into farm pond. Snails present.
053M	Perennial	Category A (60 feet)	Tributary to Cove Branch	2-foot x 1-foot drainage channel from farm pond; caddisflies present
054M	Perennial	Category A (60 feet)	Cove Branch	4- to 10-foot-wide x 1- to 2-foot-deep channel through wooded cattle area; fish, EPT insects present
055M	Intermittent	Category A (60 feet)	Tributary to Cove Branch	3-foot x 1-foot channel running through pasture; cleared to channel edge
056M	Other	Category A (50 feet)	Tributary to Cove Branch	Pond in wooded area; approximately 60 feet in diameter
057M	Perennial	Category A (60 feet)	Tributary to Overall Creek	5 foot-12 foot x 1 foot channel running through cow pasture. Aquatic insects present.
058M	Perennial	Category A (60 feet)	Overall Creek	40-foot-wide x 6-foot-deep channel; fish, crayfish, caddis, and mussel relics present
059M	Intermittent	Category A (60 feet)	Tributary to Overall Creek	3-foot x 1-foot small intermittent channel; feeds 056M (Overall Creek)
060M	Perennial	Category A (60 feet)	Harpeth River	60-foot x 8-foot channel; fish present
061M	Perennial	Category A (60 feet)	Tributary to Harpeth River	1- to 5-foot-wide x 1- to 2-foot-deep channel through agricultural field; snails present; heavily impacted by agriculture

Stream ID	Stream Category	Category	Stream Name	Field Notes
062M	Perennial	Category A (60 feet)	Tributary to Harpeth River	1- to 5-foot-wide x 1- to 2-foot-deep channel through agricultural field; snails present; heavily impacted by agriculture
063M	Other	Category A (50 feet)	Tributary to Harpeth River	Farm pond
064M	Perennial	Category A (60 feet)	Tributary to Harpeth River	1-foot x 1-foot channel; spring head
065M	Perennial	Category A (50 feet)	Nelson Creek	7-foot x 2-foot channel near newly cleared lot and house under construction
066M	Perennial	Category A (50 feet)	Tributary to Nelson Creek	4-foot x 2-foot channel; water present; aquatic insects observed
067M	Other	Category A (50 feet)	Tributary to Nelson Creek	Small pond
068M	Intermittent	Category A (60 feet)	Tributary to Nelson Creek	10-foot x 1-foot bedrock channel

EPT = Ephemeroptera, Plecoptera, and Trichoptera

J-3. Stream Crossings Within the Harpeth River Drainage in Rutherford County, Tennessee, Along the Proposed Almaville Transmission Line ROW

Stream ID	Stream Category	Category	Stream Name	Field Notes
001A	Perennial	Category A (60 feet)	Tributary to Stewart Creek	30-foot-wide x 12-foot-deep channel; centerline crosses at sluggish pool with gravel substrate; NW area of ROW would intersect gravel riffle
002A	Intermittent	Category A (60 feet)	Tributary to Stewart Creek	5-foot x 3-foot channel with bedrock/gravel substrate; feeds 001A (Stewart Creek); no water present
003A	Intermittent	Category A (60 feet)	Tributary to Stewart Creek	5 to 6 feet wide x 1 foot deep, forested
004A	Other	Category A (50 feet)	Tributary to Stewart Creek	Pond
005A	Intermittent	Category A (60 feet)	Tributary to Stewart Creek	6-foot-wide x 1-foot-deep channel, forested
006A	Perennial	Category A (60 feet)	Tributary to Stewart Creek	Seep flowing entering wetland and eventually flowing into 008A
007A	Intermittent	Category A (60 feet)	Tributary to Stewart Creek	3-foot x 1-foot channel; forested; no water
008A	Other	Category A (50 feet)	Tributary to Stewart Creek	Pond
009A	Intermittent	Category A (50 feet)	Tributary to Overall Creek	5-foot-wide by 2-foot-deep channel; forested
010A	Other	Category A (50 feet)	Tributary to Overall Creek	Pond
011A	Intermittent	Category A (50 feet)	Tributary to Overall Creek	5- to 6-foot-wide x 1-foot-deep channel; forested

Stream ID	Stream Category	Category	Stream Name	Field Notes
012A	Perennial	Category A (50 feet)	Tributary to Overall Creek	6-foot-wide x 1-foot-deep channel; forested
013A	Intermittent	Category A (50 feet)	Tributary to Overall Creek	Small 3-foot x 1-foot channel; forested; no water
014A	Perennial	Category A (50 feet)	Tributary to Nelson Creek	6-foot-wide x 2-foot-deep channel; forested
015A	Intermittent	Category A (50 feet)	Tributary to Nelson Creek	8-foot-wide x 3-foot-deep channel; forested
016A	Intermittent	Category A (50 feet)	Tributary to Nelson Creek	25-foot-wide x 2-foot-deep channel; forested
017A	Intermittent	Category A (50 feet)	Tributary to Nelson Creek	25-foot-wide x 2-foot-deep channel; forested
018A	Intermittent	Category A (50 feet)	Tributary to Nelson Creek	5-foot-wide x 1-foot-deep channel; forested
019A	Intermittent	Category A (50 feet)	Tributary to Nelson Creek	8 feet x 3 feet; forested
020A	Intermittent	Category A (125)	Tributary to Nelson Creek	Spring – 3-foot-wide and 1-inch-deep channel from a spring seep in natural area; part of Wetland JW3; stream/spring/wetland complex take up about 60 feet in ROW
021A	Intermittent	Category A (60 feet)	Tributary to Stewart Creek	10-foot-wide x 3-foot-deep channel through forest; couple of side channels
022A	Other	Category A (50 feet)	Tributary to Nelson Creek	Pond

J-4. Stream Crossings Within the Stones and Harpeth River Drainages in Rutherford County, Tennessee, Along the Proposed Christiana Transmission Line ROW

Stream ID	Stream Category	Category	Stream Name	Field Notes
001C	Intermittent	Category A (60 feet)	Tributary to Christmas Creek	8-foot-wide x 1-foot-wide channel through pasture
002C	Intermittent	Category A (60 feet)	Tributary to Lytle Creek	15-foot-wide x 4-foot-deep channel in field
003C	Perennial	Category A (60 feet)	West Fork Stones River	Stones River; 70-foot-wide x 6-foot-deep channel; slow current (dam downstream?); heavy silt deposits on a bedrock channel; fish, aquatic insects observed
004C	Perennial	Category A (60 feet)	Tributary to W. Fork Stones River	Small tributary to Stones River; wooded; little water
005C	Other	Category A (50 feet)	Tributary to W. Fork Stones River	Large pond; spillway leads to Stones River; 002C.
006C	Intermittent	Category A (50 feet)	Tributary to W. Fork Stones River	Small intermittent tributary to Panther Creek; no water present
007C	Perennial	Category A (50 feet)	Panther Creek	Panther Creek; 20-foot-wide x 4-foot-deep channel; impacted by downstream blockage and surrounding agricultural use

Stream ID	Stream Category	Category	Stream Name	Field Notes
008C	Other	Category A (50 feet)	Tributary to Panther Creek	Pond
009C	Other	Category A (50 feet)	Tributary to Panther Creek	Pond
010C	Intermittent	Category A (50 feet)	Tributary to Panther Creek	10-foot-wide x 4-foot-deep channel; dry except for one small pool
011C	Other	Category A (50 feet)	Tributary to Panther Creek	Pond
012C	Intermittent	Category A (50 feet)	Tributary to Armstrong Branch	Bedrock channel; main channel is approximately 8 feet x 2- to 3 feet wide
013C	Perennial	Category A (50 feet)	Tributary to Armstrong Branch	5-foot x 1-foot channel; forested
014C	Intermittent	Category A (50 feet)	Tributary to Armstrong Branch	3-foot-wide x 6-inch-deep channel; part of large complex of streams
015C	Intermittent	Category A (50 feet)	Tributary to Armstrong Branch	3-foot-wide x 6-inch-deep channel; part of large complex of streams
016C	Other	Category A (50 feet)	Tributary to Overall Creek	Pond
017C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	6-foot-wide x 1-foot-deep bedrock channel; small amount of water flowing
018C	Other	Category A (50 feet)	Tributary to Overall Creek	Pond
019C	Other	Category A (50 feet)	Tributary to Overall Creek	Pond
020C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	Very wide intermittent channel running through large expanse of limestone
021C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	Bedrock channel flowing through a glade; no water present
022C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	Large bedrock channel; paved with limestone
023C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	1-foot x 6-inch channel; flows through open glade area
024C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	3-foot x 1-foot channel; no water present
025C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	3-foot x 1-foot channel; no water present.
026C	Intermittent	Category A (100 feet)	Tributary to Overall Creek	Spring seep running from centerline through pasture entering channel near south end of ROW
027C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	3-foot x 1-foot channel; no water present
029C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	4-foot-wide x 2-foot-deep channel; no water present
030C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	30- to 50 feet wide x 4- to 5 feet deep
031C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	20 foot wide x 4-5 foot deep channel
032C	Intermittent	Category A (50 feet)	Tributary to Overall Creek	6-foot-wide x 2-foot-deep bedrock channel; no water present
033C	Intermittent	Category A (60 feet)	Tributary to Harpeth	4- to 6-foot-wide x 1- to 1.5-foot-deep channel; no water present

Stream ID	Stream Category	Category	Stream Name	Field Notes
034C	Intermittent	Category A (60 feet)	Tributary to Concord Creek	5-foot-wide x 1-foot-deep bedrock channel; recently cleared area upstream of crossing; channel scraped/obliterated in clearing
035C	Intermittent	Category A (60 feet)	Tributary to Concord Creek	Tributary to 034C; drains along new gravel road in cleared/scraped area
036C	Perennial	Category A (60 feet)	Tributary to Concord Creek	4-foot-wide x 1-foot-deep channel running through pasture; caddis present
037C	Intermittent	Category A (50 feet)	Tributary to Windrow Branch	10-foot-wide x 1-foot-deep bedrock channel

Appendix K – Plant Communities of Conservation Concern Within Rutherford, Williamson, and Maury Counties, Tennessee

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Appendix K – Plant Communities of Conservation Concern Within Rutherford, Williamson, and Maury Counties, Tennessee

Community Types	Common Species in the Community	Global Rank
Central Basin Limestone Glade Margin Shrubland	*Juniperus virginiana* var *virginiana* - *Forestiera ligustrina* - *Rhus aromatica* - *Hypericum frondosum* Shrubland	G3G4
Interior Plateau Chinquapin Oak - Shumard's Oak Forest	*Quercus muehlenbergii* - *Quercus shumardii* - *Carya* (*carolinae-septentrionalis*, *ovata*) Forest	G3
Interior Low Plateau Limestone Glade Ephemeral Pool	*Sedum pulchellum* - *Talinum calcaricum* - *Leavenworthia* spp./*Nostoc* commune Herbaceous Vegetation	G3
Limestone Annual Grass Glade	*Sporobolus* (*neglectus*, *vaginiflorus*) - *Aristida longispica* - *Panicum flexile* - *Panicum capillare* Herbaceous Vegetation	G3
Limestone Glade Streamside Meadow	*Dalea foliosa* - *Mecardonia acuminata* - *Mitreola petiolata* Herbaceous Vegetation	G2
Limestone Seep Glade	*Eleocharis compressa* - *Schoenolirion croceum* - *Carex crawei* - *Allium cernuum* Herbaceous Vegetation	G2?
Nashville Basin Mesic Sugar Maple - Hickory Forest	*Acer saccharum* - *Carya ovata* - *Juglans nigra*/*Symphoricarpos orbiculatus*/*Polymnia canadensis*/*Bromus pubescens* Forest	G2G3Q
Nashville Basin Post Oak Woodland	*Quercus stellata*/*Viburnum rufidulum* - *Forestiera ligustrina*/*Andropogon gerardii* Woodland	G2?
Nashville Basin Shingle Oak - Shumard's Oak - Chinquapin Oak Forest	*Quercus imbricaria* - *Quercus shumardii* - *Quercus muehlenbergii*/*Celtis occidentalis*/*Urtica chamaedryoides* Forest	G3?
Red-Cedar - Blue Ash Limestone Woodland	*Juniperus virginiana* var *virginiana* - *Fraxinus quadrangulata*/*Polymnia canadensis* - (*Astranthium integrifolium*) Woodland	G3

Source: NatureServe (http://www.natureserve.org/explorer/), 2007. Only plant communities of conservation concern (global ranks G1, G2, or G3) are given. G2 = globally imperiled; G3 = globally vulnerable to extirpation or extinction; G? = Denotes some uncertainty about the numeric rank; GQ = Distinctiveness of this entity at the current level is questionable

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Appendix L – Nonnative, Noninvasive Species Suitable For Public Use Areas, Erosion Control/Stabilization, and Wildlife Habitat Plantings

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Appendix L – Nonnative, Noninvasive Species Suitable For Public Use Areas, Erosion Control/Stabilization, and Wildlife Habitat Plantings

Compiled for the Implementation of the Executive Order on Invasive Species

KY 31 AND OTHER FESCUES - for dam reservations, public use areas, and other facilities; transmission line construction stabilization where fescue is currently present as forage or lawn grasses, or when landowners request it. Not to be used in wildlife plantings or in agricultural license areas.

ZOYSIA VARIETIES - for dam reservations, public use areas, and other facilities.

BERMUDAGRASS - for dam reservations, public use areas, and other facilities.

ANNUAL RYEGRASS - suitable for all sites.

FOXTAIL, BROWNTOP AND JAPANESE MILLETS - suitable for all sites.

BUCKWHEAT - suitable for wildlife plantings.

WINTER WHEAT - suitable for wildlife plantings.

OATS - suitable for wildlife plantings.

ORCHARDGRASS - suitable for all sites.

PERENNIAL RYEGRASS - suitable for all sites.

REDTOP - suitable for all sites.

RYE - suitable for all sites.

TIMOTHY - suitable for all sites.

WEEPING LOVEGRASS - for erosion control use only.

COMMON, KOBE, KOREAN LESPEDEZA - suitable for all sites.

CRIMSON, RED AND LADINO CLOVERS - suitable for all sites.
SOYBEANS - suitable for wildlife plantings.

SORGHUM-MILO - suitable for wildlife plantings.

Invasive Species of High Priority to TVA

Plants:
Common privet, *Ligustrum sinense*
Autumn olive, *Elaeagnus umbellata*
Japanese honeysuckle, *Lonicera japonica*
Kudzu, *Pueraria montana*
Multiflora rose, *Rosa multiflora*
Sericea lespedza, *Lespedeza cuneata*
Oriental Bittersweet, *Celastrus orbiculatus*
Tree-of-heaven , *Alianthus altissima*
Hairy jointgrass, *Arthraxon hispidus*
Amur bush honeysuckle, *Lonicera mackii* (and other closely related species)
Japanese/Nepal grass, *Microstegium vimineum*
Alligatorweed, *Alternathera philoxeroides*
Japanese bromegrass, *Bromus japonicus*
Common cucklebur, *Xanthium strumarium*
Tall fescue, *Festuca elatior**
Johnson grass, *Sorghum halapense*
Japanese wisteria, *Wisteria floribunda*
Purple loosestrife, *Lythrum salicaria*
Common reed, *Phragmites australis*
Japanese knotweed, *Polygonum cuspidatum*
Eurasian watermilfoil, *Myriophyllum spicatum*
Spinyleaf naiad, *Najas minor*
Hydrilla, *Hydrilla verticillata*
Princess tree, *Paulownia tomemtosa*

Watch List:
Giant salvinia, *Salvinia molesta*
Water hyacinth, *Eichhornia crassipes*

January 2002

Invasives Exotic Pest Plants of Tennessee

Rank 1 — Severe Threat: Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation.

Scientific Nomenclature	Common Name
Ailanthus altissima (Mill.) Swingle	Tree-of-heaven
Albizia julibrissin Durz.	Mimosa
Alliaria petiolata (Bieb.) Cavara & Grande	Garlic-mustard
Celastrus orbiculata Thunb.	Asian bittersweet
Dioscorea oppositifolia L.	Air-potato
Elaeagnus umbellata Thunb.	Autumn olive
Elaeagnus pungens Thunb.	Thorny-olive
Euonymus fortunei (Turcz.) Hand.-Mazz.	Winter creeper
Hedera helix L.	English ivy
Lespedeza cuneata (Dum.-Cours.) G. Don	Sericea lespedeza
Ligustrum sinense Lour.	Chinese privet
Ligustrum vulgare L.	Common privet
Lonicera fragrantissima Lindl. & Paxton	January jasmine
Lonicera japonica Thunb.	Japanese honeysuckle
Lonicera maackii (Rupr.) Maxim.	Amur bush honeysuckle
Lonicera morrowii A. Gray	Morrow's bush honeysuckle
Lonicera tatarica L.	Tartarian honeysuckle, twinsisters
Lonicera x bella Zabel	Bush honeysuckle
Lythrum salicaria L. [all varieties and cultivars]	Purple loosestrife
Microstegium vimineum (Trin.) A.	Camus Nepalgrass, Japanese grass
Myriophyllum spicatum L.	Eurasian water milfoil
Paulownia tomentosa (Thunb.) Sieb. & Zucc. ex Steud	Princess tree
Phragmites australis (Cav.) Trin. ex Steud.	Common reed
Polygonum cuspidatum Seib. & Zucc	Japanese knotweed, Japanese bamboo
Pueraria montana (Lour.) Merr.	Kudzu
Rosa multiflora Thunb.	Multiflora rose
Solanum viarum Dunal	Tropical soda apple
Sorghum halepense (L.) Pers.	Johnson grass
Spiraea japonica L.f.	Japanese spiraea

Rank 2 — Significant Threat: Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily into native plant communities as those species listed as **Rank 1— Severe Threat**.

Scientific Nomenclature	Common Name
Alternanthera philoxeroides (Mart.) Griseb.	Alligatorweed
Artemisia vulgaris L.	Mugwort, common wormwood
Arthraxon hispidus (Thunb.) Makino	Hairy jointgrass
Berberis thunbergii DC.	Japanese barberry
Bromus commutatus Schrad.	Meadow brome
Bromus japonicus Thunb. ex Murray	Japanese bromegrass
Bromus secalinus L.	Rye brome
Bromus tectorum L.	Thatch bromegrass, cheat grass
Carduus nutans L.	Musk thistle, nodding thistle
Centaurea biebersteinii DC.	Spotted knapweed
Cirsium arvense L. (Scop.)	Canada thistle
Cirsium vulgare (Savi) Ten.	Bull thistle
Clematis ternifolia DC.	Leatherleaf clematis
Conium maculatum L.	Poison hemlock
Coronilla varia L.	Crown vetch
Daucus carota L.	Wild carrot, Queen Anne's-lace
Dipsacus fullonum L.	Fuller's teasel
Dipsacus laciniatus L.	Cutleaf teasel
Euonymus alata (Thunb.) Sieb.	Burning bush
Festuca arundinacea Schreb.	Tall fescue
Festuca pratensis Huds.	Meadow fescue
Hesperis matronalis L.	Dame's rocket
Hydrilla verticillata (L.f.) Royle	Hydrilla, water thyme
Lespedeza bicolor Turcz.	Bicolor lespedeza, shrubby bushclover
Ligustrum japonicum Thunb.	Japanese privet
Lysimachia nummularia L.	Moneywort, creeping Jenny
Mahonia bealei (Fortune) Carriere	Oregon grape
Melilotus alba Medik.	White sweet clover
Melilotus officinalis (L.) Lam.	Yellow sweet clover
Miscanthus sinensis Andersson	Zebra grass, Chinese silver grass
Murdannia keisak (Hassk.) Hand.-Mazz.	Asian spiderwort
Myriophyllum aquaticum (Vell.) Verdc.	Parrot's feather, water milfoil
Nandina domestica Thunb.	Nandina, sacred-bamboo
Rorippa nasturtium-aquaticum (L.)	Hayek Watercress
Polygonum caespitosum Blume	Bunchy knotweed, oriental lady's-thumb
Populus alba L.	White poplar
Potamogeton crispus L.	Curly pondweed
Setaria faberi R.A.W. Herrm.	Nodding foxtail-grass, Japanese bristle-grass
Setaria italica (L.) P. Beauv.	Foxtail-millet
Setaria pumila (Poir.) Roem. & Schult.	Yellow foxtail, smooth millet
Setaria viridis (L.) P. Beauv.	Green millet
Torilis arvensis (Huds.) Link	Spreading hedge-parsley
Tussilago farfara L.	Coltsfoot
Verbascum thapsus L.	Common mullein
Vicia sativa L.	Garden vetch
Vinca minor L.	Common periwinkle
Wisteria sinensis (Sims) DC.	Chinese wisteria
Wisteria floribunda (Willd.) DC.	Wisteria
Xanthium strumarium L.	Common cocklebur, rough cocklebur

Rank 3 — Lesser Threat: Exotic plant species that spread in or near disturbed areas and are not presently considered a threat to native plant communities.

Scientific Nomenclature	Common Name
Allium vineale L.	Field garlic
Arundo donax L.	Giant reed, elephant grass
Bromus catharticus Vahl	Bromegrass, rescue grass
Bromus inermis Leyss.	Smooth bromegrass
Broussonetia papyrifera (L.) L'Her. ex Vent.	Paper mulberry
Lithospermum arvense (L.) I. M. Johnston	Corn gromwell
Cardiospermum halicacabum L.	Balloonvine, love-in-a-puff
Centaurea cyanus L.	Bachelor's button, cornflower
Chrysanthemum leucanthemum L.	Ox-eye daisy
Cichorium intybus L.	Chicory
Egeria densa Planch.	Brazilian elodea, Brazilian water-weed
Elaeagnus angustifolia L.	Russian olive
Eschscholzia californica Cham.	California poppy
Fatoua villosa (Thunb.) Nakai	Hairy crabweed
Glechoma hederacea L.	Gill-over-the-ground, ground ivy
Iris pseudacorus L.	Pale-yellow iris
Kummerowia stipulacea (Maxim.) Makino	Korean clover
Kummerowia striata (Thunb.) Schindl.	Japanese clover
Melia azedarach L.	Chinaberry
Ornithogalum umbellatum L.	Star of Bethlehem
Pastinaca sativa L.	Wild parsnip
Polygonum persicaria L.	Lady's thumb
Rubus phoenicolasius Maxim.	Wineberry
Senna obtusifolia (L.) H. S. Irwin & Barneby	Sicklepod senna
Tragopogon dubius Scop.	Yellow goat's-beard
Tribulus terrestris L.	Puncturevine
Urtica dioica L.	Stinging nettle
Xanthium spinosum L.	Spiny cocklebur

Watch List A: Exotic plants that naturalize and may become a problem in the future; includes species that are or could become widespread in Tennessee. At this time more information is needed and there is no consensus about their status.

Scientific Nomenclature	Common Name
Agrostis stolonifera L.	Weeping love grass
Alnus glutinosa (L.) Gaertn.	Sticky alder
Bromus hordeaceus L.	Soft brome
Bromus sterilis L.	Poverty brome
Buddleia davidii Franch.	Butterfly bush
Bupleurum rotundifolium L.	Hound's-ear, hare's-ear
Cosmos bipinnatus Cav.	Garden cosmos
Cosmos sulphureus Cav.	Sulpher cosmos
Echium vulgare L.	Viper's bugloss
Hibiscus syriacus L.	Rose of Sharon
Hypericum perforatum L.	Goatweed, St. John's-wort
Mentha spicata L.	Spearmint
Mentha x piperita L.	Peppermint
Muscari atlanticum Boiss. & Reut.	Grape hyacinth
Muscari botryoides (L.) Mill.	Common grape hyacinth
Najas minor All.	Water nymph
Phalaris canariensis L.	Canary grass
Pyrus calleryana Decne.	Bradford pear
Rhamnus frangula L.	Alder buckthorn
Rhodotypos scandens (Thunb.) Makino	Jetbead
Senecio vulgaris L.	Ragwort
Setaria verticillata (L.) P. Beauv.	Bur-foxtail
Solanum dulcamara L.	Bittersweet
Stachys floridana Shuttlew. ex Benth.	Hedge nettle

Watch List B: Exotic plant species that are severe problems in surrounding states but have not been reported in Tennessee.

Scientific Nomenclature	Common Name
Ampelopsis brevipedunculata (Maxim.) Trautv.	Amur peppervine
Polygonum perfoliatum L.	Mile-a-minute, Asiatic tear-thumb
Rhamnus cathartica L.	European buckthorn
Rottboellia cochinchinensis (Lour.) Clayton	Itchgrass
Salvinia molesta Mitchell	Aquarium water-moss
Sapium sebiferum (L.) Roxb.	Chinese tallowtree

Appendix M – Form AD-1006 – Farmland Conversion Impact Rating

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U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/26/07
Name Of Project RUTHERFORD SUBSTATION PROJECT	Federal Agency Involved TVA
Proposed Land Use UTILITIES/SUBSTATION	County And State RUTHERFORD TENNESSEE
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 7/26/07

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated NA	Average Farm Size 123 AC.
Major Crop(s) CORN	Farmable Land In Govt. Jurisdiction Acres: 213775	% 53	Amount Of Farmland As Defined in FPPA Acres: 129265	% 32
Name Of Land Evaluation System Used RUTHERFORD	Name Of Local Site Assessment System		Date Land Evaluation Returned By NRCS 7/26/07	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	57.5			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	57.5	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	29.1			
B. Total Acres Statewide And Local Important Farmland	0.0			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	40.8			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	57	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	15			
4. Protection Provided By State And Local Government	20	0			
5. Distance From Urban Builtup Area	15	15			
6. Distance To Urban Support Services	15	10			
7. Size Of Present Farm Unit Compared To Average	10	0			
8. Creation Of Nonfarmable Farmland	10	5			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	5			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	~~0~~ 80	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	57	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	~~0~~ 80	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	~~57~~ 137	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

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Appendix N – Tennessee Valley Authority Substation Lighting Guidelines

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APPENDIX N - TVA SUBSTATION LIGHTING GUIDELINES

FOR GREEN-FIELD SITES

Permanent substation lighting should be a two stage design. Stage-one is operated dusk to dawn for fixtures at higher mounting heights, more than 12 feet above the ground, and stage two is switch controlled for low mounting heights at 12 feet and below.

Stage-one will be continuous nighttime lighting turned on with a photocell and designed to meet minimum requirements for safety and security. The general purpose of stage-one lighting is to light the ground and general area to the fence. Designing stage-one continuous lighting should follow IESNA RP-33-99 recommended practices for maximum lighting at the fence and past the fence, except where NESC requirements supersede these guidelines for safety reasons or Federal Register requirements supersede these guidelines for spill containment facilities. Stage-one lighting fixtures mounted at an elevation above 12 feet should be of the cutoff or full cutoff type to reduce offsite glare.

The stage-two lighting will be provided for temporary operational needs and will only be turned on when required. Stage-two lighting is intended to provide visibility of substation structures and devices, to operate switches, and perform tasks. Design of stage-two lighting should follow NESC and IESNA RP-7-01 recommended practices for task lighting. .

Substation structures should be utilized for mounting stage-one and stage-two lighting fixtures wherever feasible. Lighting fixtures should be mounted at the minimum elevation required to provide coverage dictated by the required vertical and horizontal light levels and uniformity. Lights may be mounted above an elevation of 40 feet when required for security reasons, such as cameras, or lighting of objects taller than 40 feet.

REFERENCES:
IESNA RP-7-01, Recommended Practice for Lighting Industrial Facilities
IESNA RP-33-99, Recommended Practice for Lighting for Exterior Environments
NESC, National Electrical Safety Code (ANSI/IEEE C2)

FOR MINOR MODIFICATIONS TO EXISTING FACILITIES

Additional lighting required for substation modifications will follow the basic existing lighting design. To the degree possible, substation structures should be utilized to mount light fixtures. Lighting fixtures may be mounted at an elevation above 40 feet when required for site coverage, security reasons, such as cameras, or lighting of objects taller than 40 feet. All substation lights mounted at an elevation above 12 feet should be cutoff or full cutoff, such that no light is emitted from the fixture at lateral angles above 90 degrees (above the horizontal) to reduce offsite glare, unless the light is required for operational needs, such as the

operation of a disconnect switch mounted at a higher elevation. Lighting additions should follow Federal Register, NESC, IESNA RP-7-01 and IESNA RP-33-99 recommended practices for lighting to the extent possible.

The stage-one and stage-two lighting approach will not be considered for minor modifications because of the difficulty in rearranging wiring circuits for lighting power supply and control. These changes are more appropriately addressed when major modifications are made.

REFERENCES:
IESNA RP-7-01, Recommended Practice for Lighting Industrial Facilities
IESNA RP-33-99, Recommended Practice for Lighting for Exterior Environments
NESC, National Electrical Safety Code (ANSI/IEEE C2)

(For major modifications to existing substations consideration should be given to implement lighting policies for green-field sites. This can be determined during site visits and project scoping.)

General Design Issues and Design Principle Definitions

- **A Good Neighbor** – most of the design constraints are summed up by this principle. Thoughtful consideration of the neighbors is critical to the success of the design.
- **Luminaire Optical Properties** – Four designations are used for the light control of outdoor lighting fixtures; Full Cutoff (0%, <10%), Cutoff (<2.5%, <10%), Semicutoff (<5 %,< 20%), and Noncutoff. These are in terms of a percentage of the lamp's intensity lateral to the fixture, and at an angle 10 degrees below the horizontal plane.
- **Light Levels** – are determined for both horizontal and vertical surfaces by the appropriate standards. Principally ANSI/IESNA RP-7-01, IESNA RP-33-99, IESNA Lighting Handbook 9th Edition, 2000, blue pages Safety/Security-1, IESNA G-1-03, and the National Electric Safety Code, section 111.A should be considered.
- **Neighboring Property Uses** – the lighting design shall consider ways to reduce light trespass in directions where neighbors are known to exist through light fixture placement and control of the fixture light output.
- **Design Standards** – are general engineering guides to proper application of lighting equipment to achieve lighting levels consistent with their recommended standards. Primary design standards are listed under the "Light Levels" definition.
- **Physical Security Survey** – if warranted, specific lighting needs can be determined through the process outlined in IESNA G-1-03, Annex B with measurements according to Annex C.
- **Television Surveillance** – if required provides lighting compatible with the needs of camera visibility, which may or may not enhance human visibility.

- **Mounting Heights** – are a key factor in determining the uniformity or evenness of the light level. For substations, they are defined as Stage-one or Stage-two for high and low under "Mounting Locations". Generally mounting heights provide good uniformity on the ground or structure when lights are spaced a distance two times the mounting height or lateral distance. Above ground structures will have decreased uniformity by the same ratio unless this design geometry is considered. For example, lights at a 12' mounting height typically provide uniform coverage on the ground 24' wide. Spacing between fixtures of 48' would provide good uniformity on the ground. When lighting vertical structures the distance to the light affects the uniformity in the same way.
- **Mounting Locations** – Low mounting heights are defined as 12 feet and below and high mounting heights are above 12 feet.
- **Terrain** – Nuisance glare and light trespass are also a function of the substation height above or below the average local terrain including land contours and vegetation height. Terrain can shield fixtures and reduce lighting control requirements.
- **Temporary Lighting Systems** – systems designed for outages and limited to portable systems should have no restrictions due to their temporary nature.
- **Permanent Lighting Systems** – Require the most care due to their persistent effect on the neighbors.
- **New Construction Green-Field Sites** – have a higher level of care due to the clean slate available to accommodate good lighting design.
- **Minor Substation Modifications** – small modifications include substation component replacement, and expansions of less than 50% of the substation capacity. Following the existing lighting design pattern in these cases is acceptable practice to expand the lighting system coverage.
- **Extensive Substation Modifications** – modifications of the site voltages or expansions of more than 50% capacity. Lighting should be evaluated by Engineering Design to determine feasibility of using the design approaches of new construction green-field sites.
- **Safety** – Wherever unsafe conditions are present in the judgment of Engineering Design, additional lighting is warranted.

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Appendix O – Noise During Transmission Line and Substation Construction and Operation

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Appendix O – Noise During Transmission Line and Substation Construction and Operation

At high levels, noise can cause hearing loss; at moderate levels, noise can interfere with communication, disrupt sleep, and cause stress; and at low levels, noise can cause annoyance. Noise is measured in decibels (dB), a logarithmic unit, so an increase of 3 dB is just noticeable, and an increase of 10 dB is perceived as a doubling of sound level. Because not all noise frequencies are perceptible to the human ear, A-weighted decibels (dBA), which filter out sound in frequencies above and below human hearing, are typically used in noise assessments.

Both the U.S. Environmental Protection Agency (USEPA) and the Department of Housing and Urban Development (HUD) have established noise guidelines. USEPA guidelines are based on an equivalent sound level day/night (DNL) which is a 24-hour average sound level with 10 dB added to hours between 10 p.m. and 7 a.m., since people are more sensitive to nighttime noise. USEPA recommends a guideline of DNL less than 55 dBA to protect the health and well-being of the public with an adequate margin of safety. HUD guidelines use an upper limit DNL of 65 dBA for acceptable residential development and an upper limit DNL of 75 dBA for acceptable commercial development. TVA generally uses the USEPA guideline of 55 dBA DNL at the nearest residence and 65 dBA at the property line in industrial areas to assess the noise impact of a project. In addition, TVA gives consideration to the Federal Interagency Committee on Noise (FICON) 1992 recommendation that a 3 dB increase indicates possible impact, requiring further analysis when the existing DNL is 65 dBA or less.

Annoyance from noise is highly subjective. The FICON used population surveys to correlate annoyance and noise exposure (FICON, 1992). Table O-1 gives estimates of the percentage of typical residential populations that would be highly annoyed from a range of background noise and the average community reaction description that would be expected.

Table O-1. Estimated Annoyance From Background Noise (FICON, 1992)

Day/Night Level (dBA)	Percent Highly Annoyed	Average Community Reaction
75 and above	37	Very severe
70	25	Severe
65	15	Significant
60	9	Moderate
55 and below	4	Slight

For comparative purposes, typical background DNLs for rural areas range from about 40 dBA in undeveloped areas to 48 dBA in mixed residential/agricultural areas (Cowan, 1993). Noise levels are typically higher in higher density residential and urban areas. Background noise levels greater than 65 dBA can interfere with normal conversations, requiring people to speak in a raised voice in order to carry on a normal conversation.

Construction Noise
Construction noise impacts would vary with the number and specific types of equipment on the job, the construction methods, the scheduling of the work, and the distance to sensitive noise receptors such as houses. Typical construction activities are described in Section 2.7.1 for a substation and in Section 2.7.2 for a transmission line. Maximum noise levels generated by the various pieces of construction equipment typically range from about 70 to 85 dBA at 50 feet (Bolt, Beranek, and Newman, 1971). An exception would be the use of track drills for building roads and installing foundations in rocky areas; track drills have a typical maximum noise level of 98 dBA at 50 feet. Use of track drills is not expected to be widespread.

Project-related construction noise levels would likely exceed background noise levels by more than 10 dBA at distances from within 500 feet in developed areas to over 1000 feet in rural areas with little development. These distances are without the use of track drills; drilling activities could increase the distances by an additional 500 feet. A 10-dBA increase would be perceived as a large increase over the existing noise level and could result in annoyance to adjacent residents. The residential noise level guideline of 55 dBA could also be temporarily exceeded for residences near construction activities.

Construction activities would be limited to daylight hours. Because of the sequence of construction activities, construction noise at a given point along the transmission line would be limited to a few periods of a few days each. Construction of the substation would take longer, though it would still be limited in duration. The temporary nature of construction would reduce the duration of noise impacts on nearby residents.

Operational Noise
Transmission lines and substations can produce noise from corona discharge, which is the electrical breakdown of air into charged particles. Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise. Corona noise is greater with increased voltage and is also affected by weather. It occurs during all types of weather when air ionizes near irregularities, such as nicks, scrapes, dirt, and insects on the conductors. During dry weather, the noise level is low and often indistinguishable off the right-of-way from background noise. In wet conditions, water drops collecting on the conductors can cause louder corona discharges.

For 500-kV transmission lines, this corona noise when present, is usually about 40-55 dBA. The maximum recorded corona noise has been 60-61 dBA (TVA unpublished data). During rain showers, the corona noise would likely not be readily distinguishable from background noise. During very moist, non-rainy conditions, such as heavy fog, the resulting small increase in the background noise levels is not expected to result in annoyance to adjacent residents. The substation would also produce similar levels of noise from corona discharge, though it is not expected to cause annoyance to nearby residents.

Transformers at the substation would generally operate in self-cooled mode, though a few days a year during extreme temperatures, transformers would operate in fan-cooled mode. When fans are used, they would generate approximately 85 dB at 3 feet. This is not expected to be audible over background noise at the nearest residence 0.4 miles (0.7 km) away.

The substation would produce a loud impulse noise when a breaker is tripped due to excessive current, high voltage, low voltage, low frequency or other less common problems.

When such problems occur, the circuit breaker opens to disconnect part of the system, and the flow of current is interrupted. The noise from the breaker is expected to last 1/20 of a second and range from 96 to 105 dB at 50 feet. Breaker noise would be quite loud, though it is only expected to occur about 18 times each year. Breaker noise may be audible in the nearest residence 0.4 miles away; though, because of the infrequent occurrence, it would not result in a significant impact.

Periodic maintenance activities, particularly vegetation management, would produce noise comparable to that of some phases of transmission line construction. This noise, particularly from bush-hogging or helicopter operation, would be loud enough to cause some annoyance. It would, however, be of very short duration and very infrequent occurrence.

Literature Cited

Bolt, Beranek, and Newman. 1971. *Noise From Construction Equipment and Operation, Building Equipment, and Home Appliances.* U.S. Environmental Protection Agency Report NTID300.1.

Cowan, J. P. 1993. *Handbook of Environmental Acoustics*. Wiley, New York.

Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* Fort Walton Beach, Fla.: Spectrum Sciences and Software Inc.

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